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U. S. NAVAL OBSERVATORY

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May, 1929.

PREFACE

This volume, having been subjected to the customary review of the astronomical council, is approved for publication.

C. S. Freeman,
Captain, United States Navy, Superintendent.

United States Naval Observatory,
June, 1928.

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LIST OF PLATES

ERRATA

VOLUME IX, PART I, SECOND SERIES.

Page A141. In column 1. For B. D.+17°867 read B. D.+17°869.
Page A194. In column 4. For B. D.+19°2355 read B. D.+19°2232.
Page A399. No. 1041, Name. For B. D.+17°867 read B. D.+17°869.
Page A410. No. 1784, Name. For B. D.+19°2355 read B. D.+19°2232.

When the observing books were revised the following errata were collected relating to equatorial observations printed in the Astronomical Journal:

Vol. 26.—Page 41, line +28, (202) Chryseis, Mar. 28. For $_n$9.441 read $_n$9.370.
For 0.471 read 0.666.
Page 51, line +5. For (Moorhouse) read (Morehouse).
Page 51, line +9. For 0.538 read $_n$0.538.
Page 51, line +10. For +4′ 41″.5 read +4′ 41″.6.
Page 51, line +10. For $21^h\ 20^m\ 43^s.44$ read $21^h\ 20^m\ 43^s.52$.
Page 51, line +10. For +72° 12′ 8″.2 read +72° 15′ 53″.6.
Page 51, line +10. For 9.639 read 9.633.
Page 51, line +10. For $+2^s.89$ read $+2^s.90$.
Page 51, line +22. For +4′ 15″.6 read −4′ 15″.7.
Page 51, line +22. For −7° 22′ 3″.9 read −7° 30′ 35″.2.
Page 51, line −14. For $21^h\ 25^m\ 19^s.46$ read $21^h\ 25^m\ 19^s.53$.
Page 51, line −14. For +72° 7′ 5″.3 read +72° 10′ 50″.6.
Page 51, line −14. For Dorpat Z+71°.1068 read Berlin C, A. G. 3030.
Page 182. Halley notes May 4. For 13″ read 6″.5.
Page 185, line −18. For *e* Aquarii read *τ* Aquarii.

Vol. 27.—Page 18, Titania, 1908, June 26. For 31° 11′.3 read 31° 32′.9.
July 1. For 238° 48′.1 read 239° 13′.4.
July 5. For 42° 23′.5 read 42° 48′.8.
July 8. For 172° 50′.3 read 173° 15′.7.
July 10. For 249° 7′.1 read 249° 32′.5.
July 28. For 274° 9′.3 read 274° 34′.7.
Aug. 1. For 75° 27′.8 read 75° 53′.2.
Page, 18, Titania-Oberon, 1908, June 26. For 312°.052 read 312°.412.
June 28. For 5°.388 read 5°.811.
July 5. For 229°.020 read 229°.443.
July 8. For 335°.057 read 335°.480.
July 10. For 33°.189 read 33°.612.
July 17. For 267°.721 read 268°.144.
July 28. For 118°.008 read 118°.431.
July 29. For 151°.095 read 151°.518.
Aug. 2. For 279°.127 read 279°.550.
Page 24, line − 6. For Saturn read Uranus.
Page 98, line −12. For Comments read Comets.

Vol. 29.—Page 61, line −25. For $3^h\ 1^m\ 54^s.3$ read $3^h\ 3^m\ 4^s.3$.
Page 61, line −25. For +42° 38′ 34″ read +42° 38′ 47″.
Page 61, line −22. For (551) Ortrud read (384) Burdigala.
Page 61, line −17. For Asteroid read (659) Nestor?
Page 61, line −17. For $3^h\ 15^m\ 7^s.9$ read $3^h\ 15^m\ 8^s.5$.
Page 61, line −17. For +23° 16′ 37″ read +23° 16′ 13″.
Page 61, line −11. For +29° 15′ 37″ read +29° 15′ 30″.
Page 61, line −10. For $9^h\ 17^m\ 24^s.5$ read $9^h\ 17^m\ 24^s.0$.
Page 61, line −10. For +40° 20′ 14″ read +40° 20′ 3″.
Page 61, line −3. For Asteroid * read [1915YJ].
Page 62, line +3. For 1914, 1914.0 read 1915, 1915.0, 1915.0.
Page 62, line +6. For Asteroid * read [1915YJ].
Page 62, line +13. For Asteroid * read [1915YJ].
Page 62, line +28. For Dec. 21 read Nov. 21.

Vol. 30.—Page 202, line −22. For (102) Miriam read (259) Aletheia.
Page 202, line −19. For (102) Miriam read (259) Aletheia.
Page 217, line −21. For (102) Miriam read (259) Aletheia.

Vol. 31.—Page 163, line +3. For 1917 read 1918.
Page 164, lines +15, +16, +21, +23, +24. For H read Hl.
Page 164, line +24. After this line insert Hl=A. Hall, Bn.=H. E. Burton.
Page 164, line −5. Before H. E. Burton insert A. Hall.
Page 203, line +27. Before Hill insert Hall A.

Vol. 32.—Page 60, lines −1, −2, −3, −4, −5, −6, −8. For 1917 W 15 read (886) Washingtonia.
Page 97, line +6. For (886) 1917 W 15 read (886) Washingtonia.
Page 97, line −15. For 65 Cybele read (184) Dejopeja.
Page 97, line −14. For 65 Cybele read (184) Dejopeja.
Page 97, line −14. For $11^h\ 9^m\ 53^s.11$ read $11^h\ 9^m\ 52^s.58$.
Page 97, line −10. For 65 Cybele read (184) Dejopeja.
Page 97, lines −13, −9. For 17 Thetis read (65) Cybele.
Page 97, lines −12, −8. For (184) Dejopeja read (214) Aschera.
Page 98, line +4. For Nov. 29 read Nov. 30.
Page 98, line +5. For Nov. 29 read Nov. 30.
Page 107, line −25. For Borelly's read Borrelly's.
Page 112, line −7. For Borelly's read Borrelly's.
Page 134, line +5. For Glanke read Glauke.
Page 134, line +10. For $16^h\ 55^m\ 32^s.85$ read $15^h\ 55^m\ 32^s.85$.

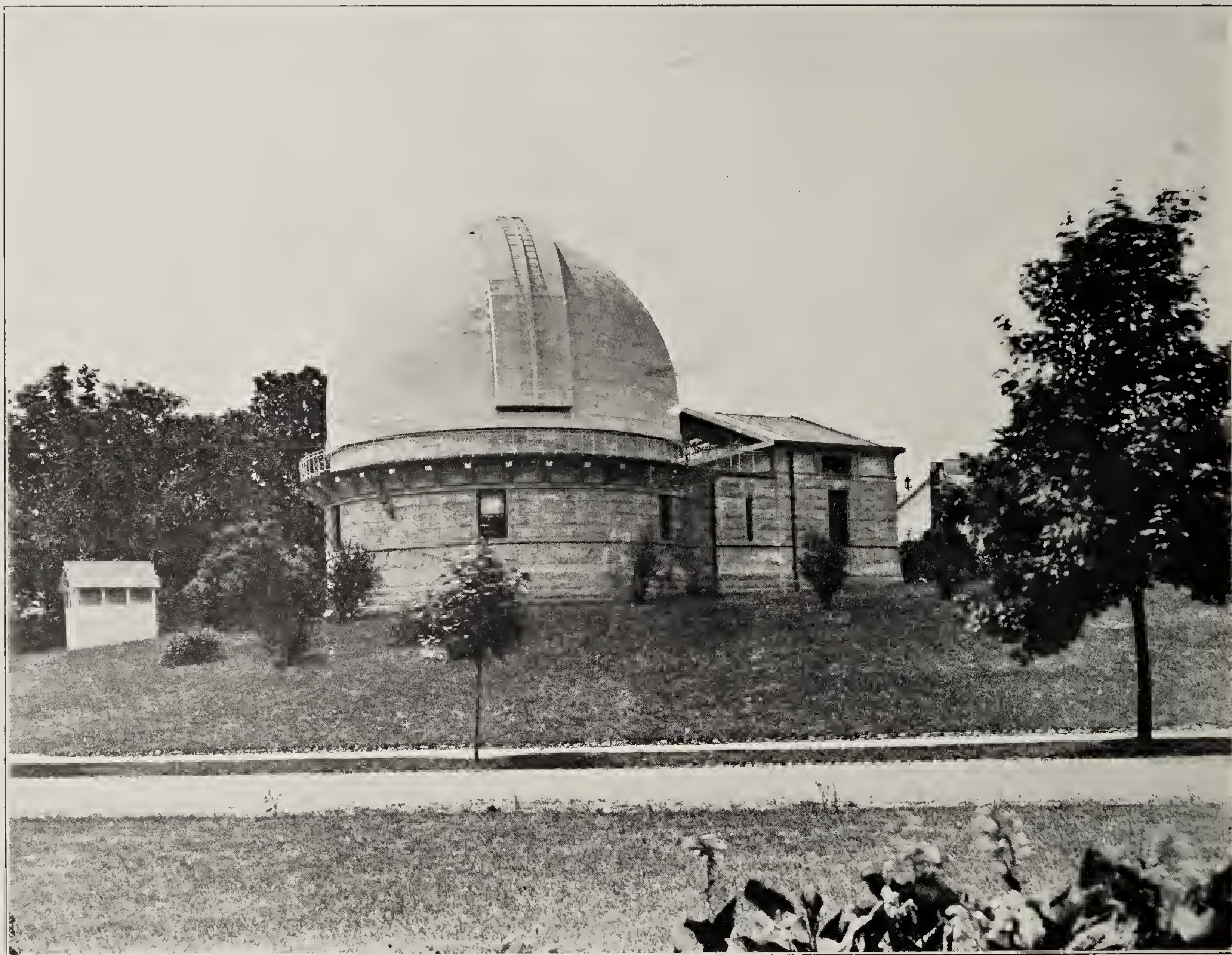
Vol. 35.—Page 101, line +6. In App. δ. For $^{h\ m\ s}$ insert $^{\circ}\ '\ ''$.
Page 101, line −11. For $23^h\ 22^m\ 12^s.85$ read $23^h\ 22^m\ 12^s.87$.
Page 101, line −11. For $+17^\circ\ 54'\ 18''.5$ read $+17^\circ\ 54'\ 19''.4$.
Page 101, line −3. For "The X coordinate of the" read In the Ast. Bor. +17.2324, for A=−1.9235 read −0.9235.
Page 102, Star 20. For $23^h\ 22^m\ 2^s.20$ read $23^h\ 22^m\ 2^s.22$.
Page 102, Star 20. For $+17^\circ\ 59'\ 49''.7$ read $+17^\circ\ 59'\ 50''.6$.
Page 149. At the head of the date column insert 1919.
Page 151, lines +15, +21. For 1921 W 18 read (637) Chrysothemis?
Page 170. Under 1923 in date column insert Sept.

Vol. 37.—Page 6, lines −3, −5, −7, −9, −11, −13, −15. For Potomac read (323) Brucia.
Page 7, lines +4, +6. For Potomac read (323) Brucia.
Page 7, lines +21, +23, +24. For [1923 PG] read (1028) [1923 PG].

Part I

EQUATORIAL OBSERVATIONS

1908-1926



THE BUILDING AND DOME OF THE 26-INCH EQUATORIAL

INTRODUCTION

By Asaph Hall and H. E. Burton

Part I of this volume contains the visual observations made with the equatorials of this observatory from January 1, 1908, to January 1, 1927, except a few observations made in 1908 and published in Publications of the United States Naval Observatory, Second Series, Volume VI. A few observations made in 1907 are also included in this part, since they did not appear in Volume VI.

The instruments in use have been the 26-inch and the 12-inch equatorials; also, occasionally, a number of 5-inch equatorials, the 5-inch finder of the 26-inch equatorial, and the 4-inch finder of the 12-inch equatorial.

Miscellaneous data concerning the principal instruments of the equatorial and astrographic divisions are as follows, the altitude being measured from mean sea level to floor under equatorial and to top of pier under photoheliograph.

Instrument	Longitude	Latitude	Altitude	Focal Length	Object Glass by—	Mounting by—	Erected
	h m s	° ′ ″	*Feet*	*Feet*			
The 26-inch equatorial	5 8 15.78	+38 55 12.3	[1] 280	32.475	Clark (1873)	Warner and Swasey	1893
The 12-inch equatorial	5 8 15.55	+38 55 12.3	[2] 313	15.050	Clark (1895)	Saegmüller	1895
The 10-inch photographic equatorial	5 8 15.59	+38 55 6.7	[2] 250	9.42	G. H. Peters (1911)	Clark (old 26-inch)	1911
The 5 inch photoheliograph	5 8 15.69	+38 55 10.5	[2] 265	40	Clark (1874)	Clark	1894

[1] U. S. Coast and Geodetic Survey, 1927.
[2] Derived from contour map prepared by the Bureau of Yards and Docks of the Navy Department, 1915.

The new Naval Observatory was occupied in 1893. The center of the clock-house floor being taken as the position of the observatory, the coordinates and altitude above sea level are as follows:

Longitude	Latitude	Altitude
h m s	° ′ ″	
5 8 15.78	+38 55 14.0	[1] 284 feet

Personnel.—The equatorial division, including the 26-inch and 12-inch equatorials, was established December 1, 1903.[1a]

The work of the photographic equatorial and photoheliograph was incorporated with the equatorial division in September, 1909,[2] and was continued with it through December, 1927.

The following astronomers have had supervision of these instruments:

W. S. Eichelberger, professor of mathematics, United States Navy, in charge of all observational work through July 28, 1908.

Asaph Hall, professor of mathematics, United States Navy, in charge of the equatorial division from July 29, 1908.

[1] U. S. Coast and Geodetic Survey, 1927.
[1a] Superintendent's Report for 1904, p. 27.
[2] Superintendent's Report for 1910, p. 8.

George H. Peters, assistant, assistant astronomer, associate astronomer, astronomer, in charge of photographic equatorial and photoheliograph.

The following members of the Naval Observatory staff have taken part in both the observations and reductions:

Asaph Hall, professor of mathematics, United States Navy, from March 20, 1908.

H. L. Rice, assistant astronomer, professor of mathematics, United States Navy, to September 21, 1907.

J. C. Hammond, assistant astronomer, to October 3, 1908.

George H. Peters, from January 1, 1908.

Matt Frederickson, assistant, to October 28, 1909.

James B. Eppes, assistant, from October, 1908, to January 2, 1912.

Harry E. Burton, miscellaneous computer, assistant, assistant astronomer, associate astronomer, from November 4, 1909, to November 5, 1919, and from April 1, 1925.

Chester B. Watts, assistant; from January 2, 1912, to September 30, 1914.

A. G. Webster, Jr., miscellaneous computer, from October 6, 1914, to June 30, 1915.

Ernest Clare Bower, assistant, associate astronomer, from July 7, 1915, to April 1, 1925.

During his connection with the equatorial division Mr. Bower took an active part in the observing and computing. He introduced a number of good schemes of computation and arranged for publication many of the observations given in this volume.

Occasional observations were made by persons when not officially connected with the equatorial division, as follows:

With the 26-inch equatorial by R. Burnside Potter; with the 12-inch equatorial by George A. Hill, William A. Conrad, and John Edwin Willis; with the 5-inch equatorials by J. A. Hoogewerff, H. E. Smith, F. B. Littell, J. C. Hammond, George A. Hill, H. E. Burton, Paul Sollenberger, and Gerald C. Whittaker; with the 5-inch finder of the 26-inch equatorial by C. W. Frederick.

Also, reductions of observations taken by the equatorial division and computations in connection with them have been made by the computing section under the direction of Miss E. A. Lamson, assistant, associate astronomer.

I. THE 26-INCH EQUATORIAL

For a description of the 26-inch and 12-inch equatorials reference is made to Publications of the United States Naval Observatory, Second Series, Volume VI.

The following data concerning the 26-inch equatorial were furnished by Warner and Swasey, Cleveland, Ohio, who designed and constructed the telescope, elevating floor, and dome.

Telescope

Column, 25 feet high; weight, 18 tons.
Polar axis of steel, 9 inches in diameter; weight, 1,800 pounds.
Declination axis of steel, 8 inches in diameter; weight, 1,200 pounds.
Main driving wheel, 51 inches in diameter.

Revolving the polar axis moves 6½ tons.
Revolving the declination axis moves 2 tons.
Weight of driving clock, 1,300 pounds.
Driving clock moves telescope in solar, sidereal, and lunar time.
Object glass, by Alvan Clark & Sons; diameter, 26 inches clear aperture; weight with cell, 220 pounds.
Tube 32½ feet long, 32 inches in diameter; weight, 1½ tons.
Dials on pier indicate declination, right ascension, and hour angle.
Total weight of telescope and mounting, 28 tons.

Elevating Floor

Diameter of elevating floor, 41 feet.
Four hydraulic rams, 8 inches in diameter, give a rise of 12 feet.
Total weight of floor, 15 tons, nearly balanced by counterweights.

Dome

Outside diameter of dome, 45 feet.
Direct pressure required to revolve the dome, 2½ pounds per ton.
Shutter opening, 39 feet long by 6 feet wide.
Weight of double shutters, 2½ tons.
Weight of dome, 24 tons.

In the following pages may be found data pertaining to this instrument not given in Volume VI.

The objective.—The lenses were removed from the cell and cleaned by Mr. Lundin, Sr., of Alvan Clark & Sons Co., on May 20, 1908. The separators between the lenses appear to have been changed slightly, causing a small, unknown change in the focal length of the object glass. The lenses were removed from the cell and cleaned by Mr. Lundin, Sr., on November 13, 14, 1912. The separators were not changed.

On April 5, 1913, the lenses were removed from the cell by Mr. Lundin, Jr., and separated far enough to wipe off finger marks and chalk dust left from the cleaning of November 13, 14, 1912. The separators were not changed.

In March, 1915, at the suggestion of Prof. C. S. Hastings, of Yale University, an examination was made of the position of the Newton's rings produced by means of a sodium flame held 6 or 7 feet in front of the objective.

The center of the ring system was found to be about 3 inches from the center of the objective, and a small portion of the objective near the cell was discolored.

The lenses were removed from the cell and cleaned by Mr. Lundin, Jr., on June 14, 15, 16, 1915. Two of the separators were built up a trifle, in order to bring the center of the Newton's rings to the center of the objective. The focal length of the objective was changed slightly and made shorter by 0.027 inch. (See p. 30.)

Eventually the 26-inch lenses ought to be refigured in such a way as to remove all stains and scratches, and the lenses should be separated some distance, in order that the glass might follow more rapidly the temperature changes of the air and that the reflections from the interior surfaces of the objective might be minimized.

However, on account of the difficulty of obtaining large pieces of optical glass, and having in view possible accidents, it is considered advisable that the refiguring should not be undertaken until the Naval Observatory has in its possession new lenses of 26 inches diameter or larger.

On July 9, 1909, a loose rivet was taken out from inside the tube of the 26-inch.

The list of the positive eyepieces with which the 26-inch equatorial is provided is given in the following table:

Positive Eyepieces, 26-inch Equatorial

Eyepiece	Power	Focal Length	Field	Maker	Type	Remarks
		mm	′			
I	390	25. 4	4. 9	Edward Kahler	Single lens	
II	585	16. 9	3. 2	Edward Kahler	Single lens	
III	780	12. 7	2. 6	Edward Kahler	Single lens	
IV	1560	6. 3	1. 8	Edward Kahler	Single lens	
1A	178	55. 6	12. 0		Ramsden	
2A	284	34. 8	8. 1	Edward Kahler	Ramsden	
3C	360	27. 5	7. 8	Edward Kahler	Ramsden	Double convex eye-lens.
3	392	25. 2	9. 9	Clark & Sons	Ramsden	
7C	761	13. 0	3. 2	Edward Kahler	Ramsden	Crown.
8F	875	11. 3	3. 2	Edward Kahler	Ramsden	Flint.
9	1103	9. 0	2. 6	Edward Kahler	Ramsden	
10	1282	7. 7	2. 1	Edward Kahler	Ramsden	
11	1802	5. 5	1. 6	Edward Kahler	Ramsden	
AF54	183	54. 0	12. 0	Steinheil	Achromatic	
AF27	367	27. 0	6. 3	Steinheil	Achromatic	
3A	375	26. 4	6. 6	Edward Kahler	Achromatic	
3B	388	25. 5	6. 5	M. E. Kahler	Achromatic	
AF20	495	20. 0	3. 9	Steinheil	Achromatic	
AF20	495	20. 0	3. 8	Steinheil	Achromatic	
5A	525	18. 9	4. 2	Edward Kahler	Achromatic	
5B	525	18. 9	4. 2	M. E. Kahler	Achromatic	
F_{15}	650	15. 2	4. 1	M. E. Kahler	Achromatic	
8C	771	12. 8	3. 0	Edward Kahler	Achromatic	
6A	888	11. 1	2. 3	Steinheil	Achromatic	
1	173	57. 2	13. 2	Clark & Sons	Kellner	
2	252	39. 3	9. 3		Kellner	
H_1	390	25. 4	6. 7	Hensoldt	Kellner	Totally reversing prism.
$H_{3/4}$	520	19. 1	4. 0	Hensoldt	Kellner	Totally reversing prism.
$H_{1/2}$	779	12. 7	2. 0	Hensoldt	Kellner	Totally reversing prism.
AL27	367	27. 0	6. 4	Steinheil	Orthoscopic	May be used with or without totally reversing prism.
AL20	495	20. 0	4. 0	Steinheil	Orthoscopic	
AL9	1100	9. 0	0. 9	Steinheil	Orthoscopic	

The mounting.—The mounting of the 26-inch equatorial is on the whole well constructed and very creditable to the distinguished designers. The instrumental constants change but little. (See Appendix III, Vol. IV, Second Series, Publications of the Naval Observatory; also report of Superintendent of the United States Naval Observatory for 1910, pp. 10, 11, and Astronomical Journal, No. 645. For exhibit of instrumental constants see p. 45 et seq.)

But, with reference to future improvements at this and other observatories, attention is invited to the following. (See also Introduction to Vol. VI, Second Series, Publications of the Naval Observatory.)

Through long usage, probably, there is a slight endwise play in the declination spindle. (See Report of Superintendent for 1911, p. 13.) Apparently it was not intended by the makers that the instrument should be used below the pier, but for many purposes it is necessary to use it occasionally in this position. It is suggested that the construction should permit use below the pier as well as above, with an adjustment for endwise motion.

THE 26-INCH EQUATORIAL

The circles.—The large hour and declination circles are read by knife-edge verniers to 1^s and $10''$, respectively. The knife-edges collect dirt and easily become marred. It would be better to arrange for microscopes reading to $0^s.1$ and $1''$.

Originally the declination circle was not properly illuminated, and only portions of the two verniers could be read. Mr. FECKER, superintendent of the Warner & Swasey Instrument Shop, in the summer of 1909 constructed new mountings for the two small electric lamps which light the circle and verniers and placed them at a greater distance from the circle than were the old mountings, so as to give a fairly good illumination over the whole extent of each vernier. It was possible, then, to determine with the declination circle the instrumental constants ξ and ρ of Chauvenet's notation.

The driving clock.—As stated in Volume VI, Second Series, of the Naval Observatory Publications, the driving clock of the 26-inch equatorial has periodic errors which are troublesome.

In July, 1909, the worm screw which drives the large toothed wheel centered on the polar axis was sent to the makers of the mounting to be reground. (See Report of Superintendent for 1910, p. 10.)

During the year 1910–11 a careful study of the causes of the periodic error of the driving clock and of the means of remedying it was made by a board consisting of Prof. G. K. CALHOUN, United States Navy, Assistant Astronomer J. C. HAMMOND, and Assistant E. D. TILLYER. (See Report of Superintendent for 1911, pp. 11–14.)

In order to diminish the error, the driving side of the bevel gears was scraped, under the direction of the board, by a skilled mechanic from the Washington Navy Yard. The gears from the clock to the driving worm were marked, so that in case of removal they could be replaced in their proper positions.

Although the periodic error of the 26-inch driving clock was reduced by this process, it is still difficult to make measures in position angle and distance when it is necessary to slide the eyepiece far.

As suggested by Mr. SWASEY, the periodic error of the driving clock may eventually be smoothed out further by wear. It might be worth while, also, to obtain four new bevel gears, cut as accurately as possible, and try them in place of the four bevel gears which were scraped and marked.

In the construction of equatorials which are to be used especially for micrometric measures it is a question whether it would not be better to go back to the sector and sector strap arrangement, somewhat as provided on the old Clark mountings, for in them the periodic error of the driving worm is considerably diminished. (See Naval Observatory volume for 1874, first series.) However, it is necessary to pull back the sector strap about every two hours.

The driving clock of the 26-inch equatorial was last taken down and cleaned in the summer of 1926 by Mr. A. G. ILSE, instrument maker at the Naval Observatory, assisted by Mr. GUSTAVE HARRISON, mechanic.

It was found that the lower side of the large driving wheel centered on the polar axis was rubbing against the worm-screw box. To relieve this condition and

have the worm screw mesh properly with the teeth of the large wheel, one sixty-fourth inch was planed from the cast-iron block on which the worm-screw box rests.

The 26-inch equatorial building.—The walls are of brick faced with rough white marble. Care is taken as to ventilation of the dome room, so that the instrument can be made to follow the changes of temperature as rapidly as possible. The outdoor temperature would be more easily maintained in the observing room if the instrument were mounted in a building entirely separate from office rooms.

It would be better not to have masonry walls but to support the track of the dome on steel uprights set in concrete, the walls to be double, of sheet iron and louvre work, and arranged so as to be easily ventilated.

It is to be noted that moisture works through the walls of the dome, probably where the stone floor of the outside gallery is set into the walls. Inside the dome the walls are plastered, and it is necessary to repair this plaster about every three years.

The elevating floor.—Since December 7, 1896, the elevating floor has been moved by the direct pressure of the city water, reenforced by air pressure from a tank in the main building. On a few occasions the floor, when it was started up, could not be stopped but went up against the iron brackets fixed to the walls and supporting the cables to which the cast-iron counterpoises are attached. Apparently the leather valve cups were too hard, so that occasionally the valves would stick. (See also Report of the Superintendent for 1901, p. 10.)

In June, 1921, the control cylinders for moving the floor and the pilot valve were relined at the Washington Navy Yard, and the piston of the pilot valve was refitted.

In October, 1922, the movement of the floor was further improved by the Otis Elevator Co. A check valve was inserted in the discharge pipe, so as to prevent a partial vacuum in this pipe between the large dome and the main building where the discharge of water takes place. Also the ports in the cylinder carrying the pilot valve were made to match better with the ports in the cylinder of the control valve.

The water has frozen once or twice in the floor rams. Probably on two or three of the coldest nights of each winter it is better to cut off the water from the rams and not use the instrument. Occasionally the floor moves up when the water in the supply pipe is supposed to be cut off, and the instrument should not be left within reach of the floor.

The dome.—In August, 1909, the inner surface of the dome was repainted with cork paint to prevent moisture condensing and dripping on the instrument.

On April 12, 1916, one of the horizontal guide wheels was broken that runs between the two fixed tracks under the dome. Apparently in the trucks of three wheels each the ball bearings were worn, so that the guide wheels were lowered, and the shaft of one guide wheel hit against a web between the two fixed tracks.

In July and August, 1921, the trucks and guide wheels of the dome were repaired and adjusted by workmen from the Washington Navy Yard under the direction of the Acting Superintendent of the Observatory, Capt. G. E. Gelm, assisted by Mr. Bower.

Since 1921 the dome has been raised on screwjacks several times by Mr. W. L. Weast, the Observatory engineer, assisted by the firemen, for testing and adjusting the running gear.

The illumination of the instrument.—The resistance coils under the floor described in Volume VI have been gradually done away with. These coils reduced the voltage of the 110-volt commercial lighting circuit, so that the current could be used for the small lamps on the instrument. For some time all the lamps on the 26-inch have been 4-volt, the commercial current being passed through small transformers and sliding rheostats.

As stated in Volume VI, p. Ax, the bright-field illumination is produced by reflecting light from a small 2-candlepower lamp to the inner surface of the objective by means of a prism within the telescope tube near the eye end and just outside the cone of rays.

The adjustments for this illumination were improved by Mr. H. C. Cleve, formerly instrument maker at the Naval Observatory, and by Mr. J. Rheinbold, foreman of the nautical instrument repair shop. The bright field can be used with magnifying powers up to 750.

THE CLARK MICROMETER II OF THE 26-INCH EQUATORIAL

For previous investigations of Clark Micrometer II reference may be made to the following:

(*a*) Washington Observations for 1877—Appendix I.

(*b*) Publications of the Naval Observatory, Second Series, Volume III, page Aiv.

(*c*) Publications of the Naval Observatory, Second Series, Volume VI, pages Axiii–Axvii.

The movable slide of this micrometer consists of three brass bars which are rectangular parallelopipedons. A short bar, about 2½ inches long, serves as a nut for the micrometer screw. At each end of the short bar, and at right angles to it, is attached a bar about 5 inches long, and the two long bars carry the movable threads. Each long bar has a hook on its free end to which a spring is attached, so that in observing the micrometer screw is moved against the pull of the two springs.

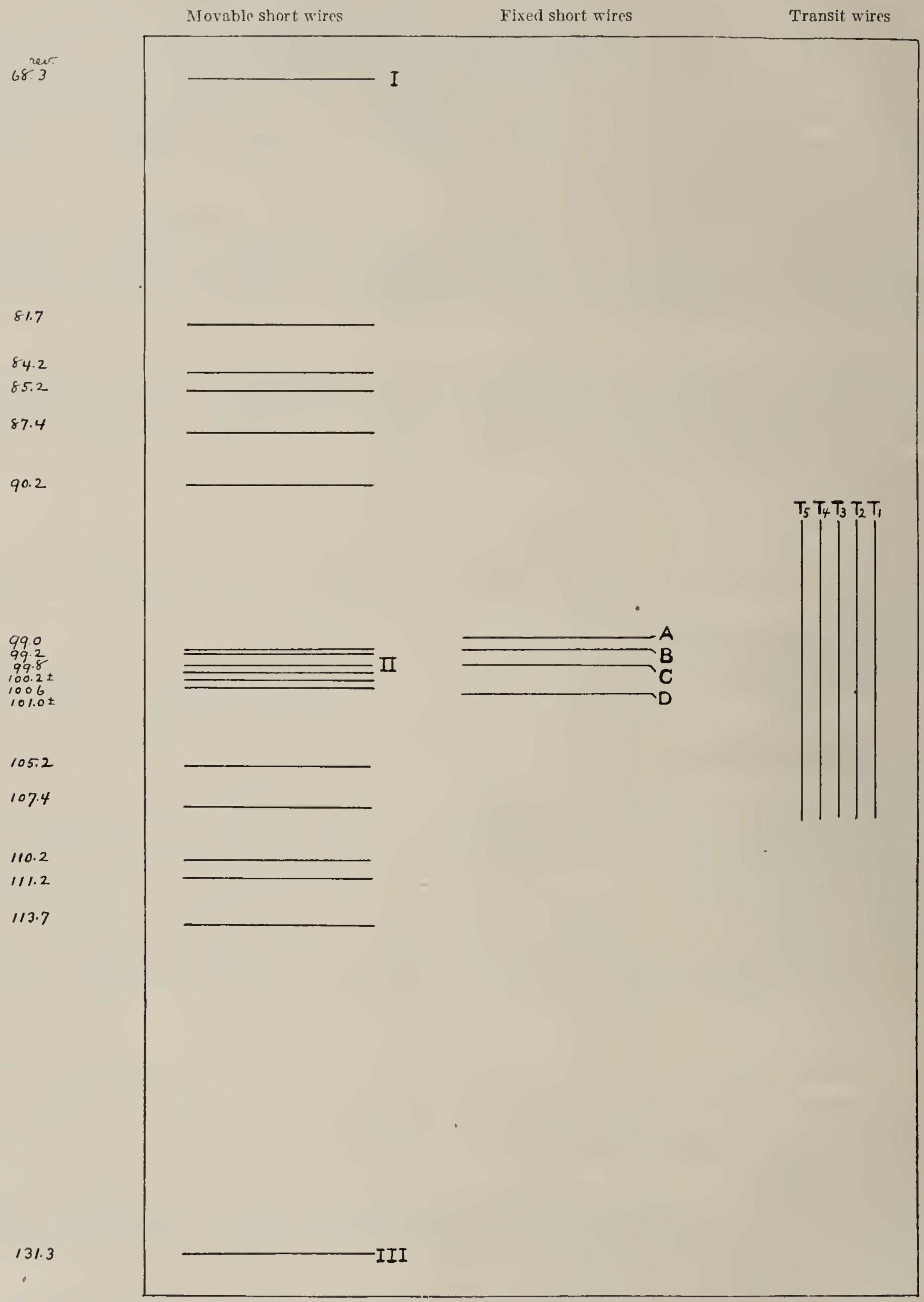
The fixed threads are on the brass plate to which the eyepiece is screwed. This plate seems to be of sheet brass, for it has a tendency to buckle. It is necessary to use care in screwing this plate down; otherwise the movable slide will break some of the threads.

The pitch of the micrometer screw is approximately 0.02 of an inch, so that for the 26-inch equatorial one revolution is about 10″. The pitch of the original box screw was about 0.04 of an inch.

In August, 1909, a new box screw was made by Warner and Swasey of nearly the same pitch as the micrometer screw. This new screw was made to work in a check nut, so as to take up lost motion.

November, 1910, the Clark Micrometer II was sent to Warner and Swasey that the movable slide might be refitted. At the same time, with the idea of keeping

the long sides of the slide parallel, a light brass bar was brazed to them, at right angles to them and near the hooks to which the springs are attached. Apparently this bar produced no change in the value of a micrometer revolution.



Scores of Clark Micrometer II

(1) *Scores of Clark Micrometer II.*—Wire I is the movable wire nearest the micrometer head and the readings increase as the wires are moved toward the head. When I is in coincidence with the fixed wire C, the head should read 68.3 revolutions in order to enter the table of progressive errors without corrections to the readings. Assuming this reading for the coincidence of I and C, the coincidences

of the movable wires with C are as given at the left of the line, which indicates the position of the score. I, II, III are the original scores for movable wires, 31.5 revolutions apart, and B is the original fixed wire score. Other scores were cut later.

A is the fixed wire score nearest the micrometer head. The intervals between the fixed wire scores are:

$$A-B=\overset{\text{rev.}}{0.6} \qquad B-C=\overset{\text{rev.}}{0.8} \qquad C-D=\overset{\text{rev.}}{1.6}$$

The intervals between the scores for the movable and the fixed short wires are shown on the same scale.

The interval between two consecutive transit wire scores is 0.18 inch, approximately, represented on about one-ninth the scale used for short-wire scores.

The length of the short wires is about 1¾ inches and the length of the transit wires about 3 inches, which dimensions are indicated on about one-ninth the scale used for short-wire scores.

(2) *Investigation of the errors of the screw under the Transit of Venus measuring engine.*—For the examination of screw errors the micrometer was placed under the Transit of Venus measuring engine, and the screw was examined by Messrs. Hall, Burton, and Watts in April, May, September, and October, 1914.

The periodic error was determined by measuring the value of half revolutions of the Clark screw in terms of the same part of the micrometer screw of the engine micrometer. Approximately $18^r.1$ of the engine micrometer $= 1^R$ of Clark II in the determination of periodic error.

All measures of periodic and progressive errors were taken with the micrometer head both north and south.

Measuring half revolutions in the middle of the Clark screw the periodic error was found to be

$$-0^r.0044 \cos u - 0^r.0009 \sin u,$$

in revolutions of the engine micrometer, or,

$$-0^R.0002 \cos u - 0^R.0000 \sin u,$$

in revolutions of Clark II, a negligible correction.

Applying the same process to the outside divisions of the Clark screw, there was obtained

$$-0^R.0003 \cos u + 0^R.0000 \sin u,$$

in revolutions of Clark II, also negligible.

For other determinations of periodic errors, including the coefficients of cos $2u$ and sin $2u$, see p. 17.

The progressive errors.—At the time of this examination of the screw of Clark II the movable micrometer slide carried only three wires, spaced at intervals of $31^R.5$, approximately.

It was decided to take the middle part of the screw as the fundamental space and express the other spaces in terms of it. The space $89^R - 111^R.5$ was taken, therefore, as fundamental—that is, the progressive errors of these revolutions were assumed to be zero—and then the interval $84^R.5 - 116^R$ was subdivided by the use of the same part of the screw of the engine into spaces of $4^R.5$. This process was followed in order that the determinations of the middle part of the screw, which is used a great deal, might not be too weak by reason of repeated subdivisions.

Corrections to the readings were applied for periodic error, and the progressive errors were treated like division errors of a scale, the results appearing as corrections to be added with the signs as written to the actual readings of Clark II.

As the result of 14 sets of measures of the interval $84^R.5-116^R$, across and back, the equations for progressive errors were found to be, in terms of the engine micrometer:

$$
\begin{aligned}
& & & \quad\ ^{r}\\
\Delta+ &\ (89)-(84.5) &=&\ 21.968\\
\Delta+ &\ (93.5)-(89) &=&\ 21.969\\
\Delta+ &\ (98)-(93.5) &=&\ 21.967\\
\Delta+ &\ (102.5)-(98) &=&\ 21.971\\
\Delta+ &\ (107)-(102.5) &=&\ 21.969\\
\Delta+ &\ (111.5)-(107) &=&\ 21.977\\
\Delta+ &\ (116)-(111.5) &=&\ 21.973
\end{aligned}
$$

Assuming (89) and (111.5) each to be zero, these equations give the following results in terms of the engine micrometer screw and that of Clark II, respectively, denoted by r and R:

	r	R
(84.5) =	+0.003 =	+0.0006
(89) =	0.000 =	0.0000
(93.5) =	−0.002 =	−0.0004
(98) =	−0.006 =	−0.0012
(102.5) =	−0.006 =	−0.0012
(107) =	−0.007 =	−0.0014
(111.5) =	0.000 =	0.0000
(116) =	+0.002 =	+0.0004

Then the two intervals $66^R.5-98^R$ and $107^R-138^R.5$ of Clark II were subdivided into spaces of $4^R.5$ thirteen and fifteen times, respectively, by the use of the threads 31.5 revolutions apart, the distance of which was compared with the middle part of the screw. The space Δ in each case was determined by the use of values which had been found provisionally for (62), (66.5), (93.5), (98), (107), (129.5), (138.5). From the two subdivisions there result finally:

	r		r
$\Delta+$ (71) − (66.5) =	21.973	$\Delta+$ (111.5) − (107) =	21.961
$\Delta+$ (75.5) − (71) =	21.972	$\Delta+$ (116) − (111.5) =	21.962
$\Delta+$ (80) − (75.5) =	21.962	$\Delta+$ (120.5) − (116) =	21.962
$\Delta+$ (84.5) − (80) =	21.976	$\Delta+$ (125) − (120.5) =	21.953
$\Delta+$ (89) − (84.5) =	21.959	$\Delta+$ (129.5) − (125) =	21.961
$\Delta+$ (93.5) − (89) =	21.965	$\Delta+$ (134) − (129.5) =	21.955
$\Delta+$ (98) − (93.5) =	21.959	$\Delta+$ (138.5) − (134) =	21.962
Δ taken as $21^r.972$		Δ taken as $21^r.951$	

Solving the above equations, each set by itself, the corrections to the respective revolutions for Clark II are:

	R		R
(71) =	+0.0041	(107) =	−0.0020
(75.5) =	+0.0041	(111.5) =	0.0000
(80) =	+0.0020	(116) =	+0.0023
(84.5) =	+0.0029	(120.5) =	+0.0047
(89) =	0.0000	(125) =	+0.0054
(93.5) =	−0.0012	(129.5) =	+0.0077
(98) =	−0.0039	(134) =	+0.0086
		(138.5) =	+0.0112

The corrections belonging to the middle interval, $84^R.5-116^R$, as found from these two subdivisions, were given half weight and combined with the values found by directly subdividing the middle interval, giving for the middle interval the following results:

	R		R
(84.5) =	+0.0014	(102.5) =	−0.0012
(89) =	0.0000	(107) =	−0.0016
(93.5) =	−0.0007	(111.5) =	0.0000
(98) =	−0.0021	(116) =	+0.0010

By direct comparison with the central space, $84^{R}.5-116^{R}$, and employing the final results for this space, corrections to the micrometer readings were obtained as follows. Each individual result represents a measurement forward and back. *N* is micrometer head north; *S*, head south. The unit is the fourth decimal place of a revolution of Clark II—that is, $0^{R}.0001$.

Rev.	N	S
(55)	−26 −19 Mean −20	−19
(57.5)	+24 +45 +20 Mean +23	+17 +14
(60)		+4
(62)	+35 +56 +39 Mean +41	+50 +31 +37
(65)	+34 +50 Mean +36	+9 +50

Rev.	N	S
(65.5)	+25 +46 Mean +41	+46
(66.5)	+25 +39 Mean +32	+30 +31 +33
(70)		+38
(75)		+34
(80)		+28
(121.5)		+13
(126.5)		+19
(129.5)	+70 +51 Mean +56	+43 +53 +58

Rev.	N	S
(131.5)		+71
(134)	+84 +71 Mean +74	+71
(135.5)	+103 +93 Mean +96	+93
(136.5)		+97
(138.5)	+107 +101 +114 +108 Mean +106	+104 +103 +102
(140)		+81
(141.5)		+96
(143.5)	+134 +123 Mean +126	+123

By the use of corrections already determined the following additional corrections to the screw readings were found:

Rev.	N	S	Rev.	N	S	Rev.	N	S
(58)	−10 Mean −12	−14	(71)		+24	(129.5)		+84
(58.5)	+4 +12 Mean 0	−7	(78)	+29		(130)	+73 Mean +72	+70
(65.5)	+38 Mean +36	+35	(118.5)	+26		(131.5)	+72 Mean +74	+75
(68)	+30 Mean +38	+46	(119)	+21 Mean +26	+30	(132)	+82 Mean +84	+87
(68.5)	+43 Mean +36	+30	(119.5)	+50		(136)	+95 Mean +100	+106
			(122.5)	+29 Mean +22	+15	(141.5)		+148
			(123.5)		+49	(142)	+122 +135 Mean +140	+151
			(125.5)		+50			
			(127.5)	+45 Mean +50	+54			

These results can be tabulated as follows, the more accurate determination being written first, and the adopted value last, in cases where there are more than one determination. As before stated, the unit is $0^R.0001$.

Rev.	Corr.	Rev.	Corr.	Rev.	Corr.	Rev.	Corr.	Rev.	Corr.
(55)	−20	(68. 5)	+36	(93. 5)	− 7	(122. 5)	+22	(132)	+ 84
(57. 5)	+23	(70)	+38	(98)	−21	(123. 5)	+49	(134)	+ 74
									+ 86
(58)	−12	(71)	+41	(102. 5)	−12	(125)	+54		+ 80
			+24						
(58. 5)	0		+38	(107)	−16	(125. 5)	+50	(135. 5)	+ 96
(60)	+ 4	(75)	+34	(111. 5)	0	(126. 5)	+19	(136)	+100
(62)	+41	(75. 5)	+41	(116)	+10	(127. 5)	+50	(138. 5)	+106
									+112
(65)	+36	(78)	+29	(118. 5)	+26	(129. 5)	+56		+108
							+77		
(65. 5)	+41	(80)	+20	(119)	+26		+84	(140)	+ 81
	+36		+28				+66		
	+38		+22	(119. 5)	+50			(141. 5)	+ 96
						(130)	+72		+148
(66. 5)	+32	(84. 5)	+14	(120. 5)	+47				+113
						(131. 5)	+71		
(68)	+38	(89)	0	(121. 5)	+13		+74	(142)	+140
							+72		
								(143. 5)	+126

From an inspection of the preceding table it is evident that measures should not be made at less than about 65^R, since probably there is not sufficient tension on the springs. At 135^R there is considerable tension, and probably the screw should not be used beyond this reading. The increased tension may account partially for the larger values of the progressive corrections as the readings increase. Some of the determinations have small weights, but were included in the table. There is no doubt that the screw varies slightly in its different parts, substantially as shown by the table. For usual measures of double distances taken symmetrically on each side of 100^R the corrections for progressive errors are negligible.

It should be stated that in this examination under the comparator the light on the threads, daylight, seemed to change a trifle after the micrometer was reversed. Also, the slide of the micrometer of the comparator appeared to be a little loose, probably worn by long usage. Therefore, another determination of the screw errors was made. (See p. 16.)

The values finally adopted are given on page 22.

The thickness of the spider lines.—The diameters of the movable spider lines were measured by HALL, BURTON, and WATTS in terms of a revolution of the micrometer of the comparator referred to above.

Thread I is the movable thread nearest the micrometer head; II is in the middle. As has been stated, each interval, II − I and III − II, is equal approximately to $31^R.5$. A thread of the engine micrometer was placed tangent to a thread of the Clark micrometer on each side of it. Each result for a diameter given below is the mean of 16 readings.

I	II	III
r	r	r
0. 252	0. 220	0. 216
0. 282	0. 230	0. 186
0. 297	0. 241	0. 226
0. 288	0. 232	0. 227
0. 260	0. 218	0. 220
0. 276	0. 228	0. 215

1^r of the comparator micrometer $= 0^R.05517$ Clark II, and in terms of 1^R of Clark II the above values become:

I	II	III
$0^R.01523$	$0^R.01258$	$0^R.01186$

or in seconds of arc

I	II	III
$0''.151$	$0''.125$	$0''.118$

$1^R = 0^{in}.018763$ at 32° F. (See Washington Observations for 1877, Appendix I, p. 10.) Then the diameters of the threads in inches and microns are:

I	II	III
$0^{in}.00028$	$0^{in}.00024$	$0^{in}.00023$
7μ	6μ	6μ

For use in correcting measures of planetary diameters the mean of the above values in arc has been taken as the thickness of a thread—that is, $0''.131$.

(3) *Investigation of the errors of the screw of Clark Micrometer II with the eyepiece microscope.*—After experience with the eyepiece microscope furnished with the new Repsold micrometer constructed for the 26-inch equatorial it was decided to adapt the microscope to Clark Micrometer II and to make a further examination of the screw.

Mr. J. RHEINBOLD cut additional scores on the movable slide of Clark II and inserted wires at suitable intervals for the examination of the screw. Also, provision was made to clamp the eyepiece microscope in any desired position.

In order to keep the Repsold micrometer in use on the 26-inch, Clark Micrometer II was placed on a bench in the east office room of the great equatorial building. By a mirror skylight was reflected through a hole in the bench onto a ground glass plate which illuminated the field with a diffused light. The measurements were made by HALL and BURTON in March, April, May, 1916.

The eyepiece microscope has a magnifying power of about 60. It is provided with a pair of fixed threads, which are placed parallel to the micrometer threads and between which the latter are set.

The periodic error was found by measuring a thread interval on the movable micrometer slide approximately equal to $2^{\mathrm{R}}.25$ in terms of three portions of the micrometer screw. The respective results were:

$$\begin{array}{llll} \mathrm{R} & \mathrm{R} & \mathrm{R} & \mathrm{R} \\ -0.0002 \cos u & +0.0001 \sin u & -0.0001 \cos 2u & -0.0000 \sin 2u \\ -0.0001 \cos u & -0.0001 \sin u & -0.0002 \cos 2u & -0.0001 \sin 2u \\ -0.0001 \cos u & -0.0001 \sin u & -0.0002 \cos 2u & +0.0000 \sin 2u \end{array}$$

The periodic error is, therefore, negligible.

The progressive errors.—To determine the progressive errors, the space $85^{\mathrm{R}}-115^{\mathrm{R}}$ was taken as fundamental. First a wire interval on the micrometer slide equal approximately to 15^{R} was employed to subdivide the space $55^{\mathrm{R}}-130^{\mathrm{R}}$.

A sample set of measures of the 15^{R} intervals is as follows, four settings being made symmetrically on each wire that was brought under the microscope:

$$\begin{array}{l} \mathrm{R} \\ \Delta+(70)-(55)=15.0113 \\ \Delta+(85)-(70)=15.0140 \\ \Delta+(100)-(85)=15.0152 \\ \Delta+(115)-(100)=15.0070 \\ \Delta+(130)-(115)=15.0058 \\ \Delta+(140)-(125)=15.0035 \end{array}$$

From the third and fourth equations $\Delta=15^{\mathrm{R}}.0111$ and the corrections for progressive error, to be added algebraically to the actual micrometer readings, are:

R	R
$(55)=+0.0031$	$(100)=-0.0041$
$(70)=+0.0029$	$(115)=0.0000$
$(85)=0.0000$	$(130)=+0.0053$

This same value of Δ, $15^{\mathrm{R}}.0111$, was used for the determination of (140) after (125) had been found by the trisection of the 15^{R} spaces. It was not possible to bring 145^{R} under the eyepiece microscope in connection with the threads 15^{R} apart on the slide.

The separate results for the 15^{R} spaces were, the unit being $0^{R}.0001$:

Micrometer Head, South					
(55)	(70)	(85)	(100)	(115)	(130)
+31	+29		−41		+53
18	28		37		53
23	21		40		59
33	30		33		60
23	26		39		59
+33	+36		−42		+47
+27	+28	00	−39	00	+55
Micrometer Head, North					
(55)	(70)	(85)	(100)	(115)	(130)
+06	+14		−34		+61
+16	20		37		52
−05	18		35		59
+26	28		33		57
15	20		36		53
17	16		36		54
10	20		30		55
06	14		34		56
+16	+24		−39		+53
+12	+19	00	−35	00	+56
Mean .. +20	+24	00	−37	00	+56

Employing the values just obtained, the 15^R intervals were trisected by means of threads approximately 5^R apart, giving:

Micrometer Head, South									
(60)	(65)	(75)	(80)	(90)	(95)	(105)	(110)	(120)	(125)
+34	+38	+20	+13	−18	−38	−34	−19	+22	+40
33	35	15	13	24	35	19	09	12	27
39	34	18	11	14	36	34	16	21	37
29	30	21	17	16	32	29	20	23	34
+29	+32	+19	+14	−28	−34	−34	−24	+23	+33
+33	+34	+19	+14	−20	−35	−30	−18	+20	+34
Micrometer Head, North									
(60)	(65)	(75)	(80)	(90)	(95)	(105)	(110)	(120)	(125)
+19	+22	+14	+06	−15	−32	−25	−11	+17	+31
17	21	15	06	16	29	24	13	21	37
22	24	18	15	18	38	24	12	09	30
19	23	18	10	23	33	22	09	09	26
+18	+18	+19	+15	−13	−33	−29	−15	+12	+34
+19	+22	+17	+10	−17	−33	−25	−12	+14	+32
Mean. +26	+28	+18	+12	−18	−34	−28	−15	+17	+33

Making use of (125) found by trisecting the 15^R spaces, and of the individual values of Δ found from the 15^R spaces, there were obtained for (140):

Micrometer Head, South	Micrometer Head, North
(140)	(140)
+110	+103
104	96
99	94
102	97
102	92
+ 94	102
+102	94
	105
	+ 95
	+ 98
Mean	+100

Using (130) and (140), the following results were obtained for (135) and (145):

Head, South (135)	Head, North (135)	Head, South (145)	Head, North (145)
+71	+79	+123	+103
76	80	121	112
79	78	118	105
76	78	129	126
+73	+75	+114	+114
+75	+78	+121	+112
Mean	+76	Mean	+116

Then, the 5^R intervals of the screw were each divided twice into five parts by means of threads on the micrometer slide having a distance apart of approximately 1^R. In this way were found the following results:

	(66)	(67)	(68)	(69)	(71)	(72)	(73)	(74)
Head, South	+35	+30	+28	+29	+30	+20	+22	+25
Head, North	+23	+17	+12	+21	+20	+21	+16	+11
Mean	+29	+24	+20	+25	+25	+20	+19	+18

	(76)	(77)	(78)	(79)	(81)	(82)	(83)	(84)
Head, South	+28	+24	+23	+19	+15	+06	+02	+01
Head, North	+10	+14	+06	+08	+05	+02	+01	+03
Mean	+19	+19	+14	+14	+10	+04	+02	+02

	(86)	(87)	(88)	(89)	(91)	(92)	(93)	(94)
Head, South	−08	−13	−16	−16	−25	−32	−39	−41
Head, North	−06	−15	−16	−14	−23	−29	−27	−26
Mean	−07	−14	−16	−15	−24	−30	−33	−34

	(96)	(97)	(98)	(99)	(101)	(102)	(103)	(104)
Head, South	−25	−19	−21	−29	−32	−33	−36	−36
Head, North	−40	−40	−41	−37	−32	−29	−29	−29
Mean	−32	−30	−31	−33	−32	−31	−32	−32

	(106)	(107)	(108)	(109)	(111)	(112)	(113)	(114)
Head, South	−32	−29	−26	−21	−12	−01	−04	−08
Head, North	−22	−24	−19	−18	−13	−05	−04	+03
Mean	−27	−26	−22	−20	−12	−03	−04	−02

	(116)	(117)	(118)	(119)	(121)	(122)	(123)	(124)
Head, South	+11	+15	+11	+25	+26	+30	+29	+31
Head, North	+03	+11	+14	+14	+20	+22	+26	+32
Mean	+07	+13	+12	+20	+23	+26	+28	+32
	(126)	(127)	(128)	(129)	(131)	(132)	(133)	(134)
Head, South	+35	+41	+45	+56	+61	+65	+67	+71
Head, North	+35	+42	+34	+47	+57	+60	+69	+73
Mean	+35	+42	+40	+52	+59	+62	+68	+72

The table of progressive errors adopted for use is given below. In it (55) and (60) have each been taken as zero; also, in the case of the revolutions 65^R-70^R, inclusive, the values obtained with the eyepiece microscope have been slightly modified to conform somewhat to the determinations secured with the measuring engine. To use the table of progressive errors, the coincidence of Wire I with C, the middle fixed wire, should be approximately $68^R.3$. Corrections for progressive error have been applied, but as shown in the table they are negligible in ordinary double distance measures where the mean of the readings is about 100 revolutions The fundamental interval of the screw is 115^R-85^R. For diagram of scores for the wires see page 10.

Adopted Progressive Errors of the Screw of Clark Micrometer II

Rev.	Corr.	Rev.	Corr.	Rev.	Corr.	Rev.	Corr.
	R		R		R		R
55	0. 0000	82	+0. 0004	101	−0. 0032	120	+0. 0017
60	0. 0000	83	+0. 0002	102	−0. 0031	121	+0. 0023
65	+0. 0020	84	+0. 0002	103	−0. 0032	122	+0. 0026
66	+0. 0021	85	0. 0000	104	−0. 0032	123	+0. 0028
67	+0. 0016	86	−0. 0007	105	−0. 0028	124	+0. 0032
68	+0. 0012	87	−0. 0014	106	−0. 0027	125	+0. 0033
69	+0. 0018	88	−0. 0016	107	−0. 0026	126	+0. 0035
70	+0. 0022	89	−0. 0015	108	−0. 0022	127	+0. 0042
71	+0. 0025	90	−0. 0018	109	−0. 0020	128	+0. 0040
72	+0. 0020	91	−0. 0024	110	−0. 0015	129	+0. 0052
73	+0. 0019	92	−0. 0030	111	−0. 0012	130	+0. 0056
74	+0. 0018	93	−0. 0033	112	−0. 0003	131	+0. 0059
75	+0. 0018	94	−0. 0034	113	−0. 0004	132	+0. 0062
76	+0. 0019	95	−0. 0034	114	−0. 0002	133	+0. 0068
77	+0. 0019	96	−0. 0032	115	0. 0000	134	+0. 0072
78	+0. 0014	97	−0. 0030	116	+0. 0007	135	+0. 0076
79	+0. 0014	98	−0. 0031	117	+0. 0013	140	+0. 0100
80	+0. 0012	99	−0. 0033	118	+0. 0012	145	+0. 0116
81	+0. 0010	100	−0. 0037	119	+0. 0020		

(4) *Value of one revolution of the screw of Clark Micrometer II.*—The value of one revolution was found by Prof. T. J. J. SEE to be

$$R=9''.9328-0''.000055\ (T-28°\ F.) \qquad \text{(A)}$$

(See Publications of the Naval Observatory, Second Series, Vol. III, Pt. I, p. Avi; also Vol. VI, p. Axvi.)

The above value (A) of a revolution was used for the following observations as published in the Astronomical Journal, no corrections for errors of the screw being applied:

Satellites of Saturn, opposition of 1908, published in No. 621. Satellites of Uranus, oppositions of 1908, 1909, 1910; No. 627. Satellite of Neptune, opposition of 1908–09, 1909–10, No. 622. Asteroids, comets, Satellite VI of Jupiter, until October, 1910, Nos. 605, 606, 612, 613, 616, 618–619, 621, 622, 673–674. Instrumental constants, until March 31, 1911, No. 645.

A preliminary value of a revolution of the screw of Clark II was determined by Hall from measures of the differences of declination of the stars *A* and *Z* in the cluster *h* Persei. This value is

$$R = 9''.9337 + 0''.00006\ (T - 50^\circ\ F.) \qquad (B)$$

for the focal setting $1^{in}.270$. (See Astronomical Journal No. 645.)

Preliminary values of one revolution were determined also by Frederickson, Eppes, and Burton from the same pair of stars by the same method. These determinations were very nearly the same as the result given above for (B).

For 1914.0 $\Delta\delta$ of the stars *A* and *Z* of the cluster *h* Persei was taken to be $1115''.45$ in the determination of this preliminary value.

This value (B) was used for the following observations as published in the Astronomical Journal, no corrections for screw errors being applied: Satellites of Uranus and Neptune, 1911, No. 648. Satellite of Neptune, 1911–12, No. 654. Satellites of Mars, 1909, No. 645. Asteroids, comets, Satellite VI of Jupiter, for the period from October, 1910, through June, 1915, Nos. 635–636, 649–650, 664, 665, 666, 673–674, 676, 693, 697, 698, 713.

The definitive value of a revolution of the screw of Clark Micrometer II, for the period May 20, 1908, to June 15, 1915, was found from measures with bright field of the differences of declination of three pairs of stars. As for the value (B), the stars were allowed to transit across the field, the declination settings being taken at the middle transit thread.

The three pairs of stars were:

1. *A* and *Z* in the cluster *h* Persei—that is, B. D. +56° 543 (8.0) and B. D. +56° 498 (8.6).

2. B. D. +23° 495 (8.3) and B. D. +24° 540 (8.0), Pleiades stars.

3. B. D. +24° 550 (8.8) and B. D. +24° 552 (9.1), Pleiades stars.

The authorities for the places of the Perseus stars were:

1. Der Sternhaufen h Persei, von A. Krueger, Abdruck aus den Abhandlungen der Finnischen Societät der Wissenschaften, heliometer.

2 and *3*. Volume IX, page 23, *Observations de Poulkova,* Gyldén and Nyrén, vertical circle.

4. Supplément III aux Observations de Poulkova, Romberg, meridian circle.

5. Contributions from the Observatory of Columbia University No. 24, stars 78 and 39, Young, 12 Rutherford plates.

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6. Annalen der K. Universitäts-Sternwarte in Strassburg, zweiter Band, Katalog von 858 Sternen, meridian circle.

7. Astronomische Mittheilungen von der K. Sternwarte zu Göttingen, sechster Theil, stars *f* and *c*, Schur, heliometer.

8. Astronomische Abhandlungen der Hamburger Sternwarte in Bergedorf, Band II, Nr. 2, stars 312 and 122, Messow, 2 plates.

9. Naval Observatory, 9-inch meridian circle.

10. Naval Observatory, 6-inch meridian circle.

11. Naval Observatory, 9-inch meridian circle.

12. Naval Observatory, 6-inch meridian circle.

13. Publications de Poulkova, série II, Volume XI, page 9, mean of 3 heliometers. Reduced to 1914.0, the means for s and p become $s=1342''.72$, $p=33° \, 49' \, 28''$.

14. Yale Observatory, observed with heliometer by SMITH, at the request of Superintendent of the Naval Observatory. For 1914.0, $s=1342''.68$, $p=33° \, 48' \, 2''$.

15. Yale Observatory, observed with heliometer by SMITH at the request of the Superintendent of the Naval Observatory. For 1915.0, $s=1342''.80$, $p=33° \, 50' \, 15''$.

With Newcomb's precession the difference of declination of the pair of stars in Perseus was reduced to 1914.0, giving the following results:

No.	$\Delta\delta$(1914.0)	Epoch	W_1	W_2
	$''$			
1	1115. 41	1861. 6	6	6
½ { 2	1115. 83	1870. 3	} 1	1
½ { 3	1115. 66	1873. 3		
4	1115. 20	1875. 7	1	1
5	1115. 45	1874. 4	6	6
6	1115. 53	1885. 0	4	4
7	1115. 38	1893. 75	5	4
8	1115. 37	1899. 8	1	1
½ { 9	1114. 80	1910. 0	} 2	1
½ { 11	1115. 29	1916. 0		
½ { 10	1114. 87	1914. 0	} 2	1
½ { 12	1115. 31	1915. 9		
13	1115. 48	1891. 8	10	10
½ { 14	1115. 74	1914. 2	} 6	5
½ { 15	1115. 43	1916. 0		

Weights were assigned as indicated under W_1 and W_2. The respective results are:

$$\Delta\delta=1115''.43 \text{ for } W_1; \quad \Delta\delta=1115''.48, \text{ for } W_2$$

The epoch for each result is 1889.5.

Since a preliminary value of $\Delta\delta$ for 1914.0 had been assumed to be $1115''.45$, there seemed to be no reason for changing it, and this value has been retained in the investigation of the micrometer screw; also, it has been assumed that the two Perseus stars have no relative proper motion in declination.

Dr. EDISON PETTIT has kindly communicated the following results for the yearly proper motions of these stars in declination obtained by Dr. HANNAH STEELE PETTIT:

$$\text{B. D.}+56°543=-0''.014; \quad \text{B. D.}+56°498=-0''.007$$

Dr. A. van Maanen has also found proper motions in declination for these stars: $-0''.016$ and $-0''.001$ per year, respectively.

Using the values of $\Delta\delta$ as tabulated on page 24, Burton formed equations of condition with two unknown quantities, x and μ, x being the correction to be added to 1115''.40 and μ the relative proper motion in declination per century. For the weights W_1, $x=+0''.004$, $\mu=-0''.114$. For the weights W_2, $x=+0''.051$, $\mu=+0''.009$. In the latter case the probable error of $x=\pm0''.052$. This value of the probable error has been used in the investigation of the screw—i. e., the value of $\Delta\delta$ for 1914.0 was taken as $1115''.45\pm0''.052$.

For the stars of pair (2)—that is, B. D. +23°495 and B. D. +24°540—the data were as follows, the weights being assigned arbitrarily:

	$\Delta\delta$(1914.0)	Epoch	Wt.
	''		
First Yale triangulation, heliometer	658. 39	1885. 0	5
Second Yale triangulation, heliometer	658. 53	1901. 5	5
Naval Observatory, 6-inch meridian circle	658. 44	1913. 9	2
Naval Observatory, 9-inch meridian circle	658. 67	1914. 0	2
Yale Observatory, heliometer, Smith	658. 53	1914. 2	4
Weighted mean	658. 50	1902. 5	

The probable error of the weighted mean was assumed to be $\pm0''.10$. It was assumed, also, that these stars had no relative proper motion in declination.

The Catalogue of the Pleiades by F. Hayn gives for 1914.0, $\Delta\delta=658''.46$, epoch about 1890. (See *Nr. VI, des XXXVIII Bandes, der Abhandlungen der Math.-Phys. Klasse der Sächsischen Academie der Wissenschaften,* Leipzig, 1921.) This was published after the investigation of the micrometer screw had been made.

The results of the Yale heliometer measures as communicated by Mr. Smith were for 1914.0

$$p=19°\ 1'\ 28'',\quad s=696''.58$$

For the stars of pair (3)—that is, B. D. +24°550 and B. D. +24°552—the data used for $\Delta\delta$ were:

	$\Delta\delta$(1914.0)	Epoch	Wt.
	''		
First Yale triangulation, heliometer	590. 66	1885. 0	5
Second Yale triangulation, heliometer	590. 88	1901. 5	5
Naval Observatory, 9-inch meridian circle	591. 04	1914. 0	2
Yale Observatory heliometer, Smith	590. 56	1914. 2	4
Weighted mean	590. 75	1901. 1	

The weights were assigned arbitrarily. The probable error of the weighted mean was taken as $\pm0''.15$.

The Pleiades Catalogue of Hayn gives for 1914.0, $\Delta\delta=590''.86$, epoch about 1890.

As communicated, Mr. SMITH's measures were, for 1914.0, $p=7° \ 3' \ 13''$, $s=595''.06$.

It was assumed that the stars of this pair had no relative proper motion in declination.

Below are tabulated in groups the results of observations with bright field of the differences of declination of the three pairs of stars referred to. In all cases the measures were taken by allowing the stars to transit across the field, the settings being made on the middle fixed transit thread. The wire interval on the movable slide was employed which was most nearly equal to the step to be measured in passing from one known end star to the other known end star.

In the earlier observations of the Perseus pair the micrometer screw was set at a whole revolution, and one thread of the movable wire interval was placed by means of the box screw on the star that transited first. Then, with the micrometer screw, a second thread was placed on the star that followed.

In later measures both threads of a movable wire interval were placed successively on the stars of a step by means of the micrometer screw.

Usually five measures were taken of each step. The probable error of the mean of five measures of a step arising from the accidental errors of pointings is about ± 7 in units of $0^{R}.001$. The probable error made in determining an interval in revolutions between two movable wires is taken as ± 1, and the probable error of a reading of the screw is supposed to be ± 1. The progressive errors were applied, and the values of R were reduced to the focal setting $1^{in}.280$.

Of the groups of observations which follow, the box screw was used in 1–7, Perseus pair. Eyepieces fitted with a totally reversing prism were used in groups 16, 17, 18, 19, 24, 25, 26, 28, Perseus pair, and in all groups of the Pleiades pairs.

Perseus Pair, R from Observations of $\Delta\delta$ by Transits

	R Observed	Th. F.	Obs.	Number Steps	Head Up or Down	Number Obsns.	Dates	R Reduced to 50° F.	Wt.
	″ ″	°						″ ″	
1	9.9336±0.00030	67.8	Fn.	2	u, d	5	1909—July 9, 16, 17, 20, 24	9.9327±0.00032	9.9
2	9.9334±0.00067	30.4	Ep.	2	u	3	1909—Dec. 27, 30; 1910—Mar. 4	9.9344±0.00068	2.2
3	9.9339±0.00070	65.7	Bn.	2	u, d	3	1910—July 19, 20, 21	9.9331±0.00070	2.0
4	9.9306±0.00045	29.3	Hl.	2	u	6	1909—Dec. 27, 30; 1910—Jan. 4, Feb. 13, 22, Mar. 18	9.9317±0.00047	4.6
5	9.9347±0.00030	70.1	Hl.	2	u	12	1910—July 14, 19, 20, 21, 21, 23, 23, 27, 27, Aug. 9, 20, 20	9.9336±0.00032	9.5
6	9.9332±0.00068	41.3	Hl.	2	d	2	1910—Jan. 19, Mar. 8	9.9337±0.00068	2.2
7	9.9319±0.00071	65.2	Hl.	2	d	2	1910—July 19, 20	9.9311±0.00071	2.0
8	9.9339±0.00039	60.5	Ep.	2	u	7	1910—Sept. 15, 16, 17; 1911—Sept. 6, Oct. 13, 13, Nov. 10.	9.9333±0.00040	6.3
9	9.9336±0.00044	36.0	Ep.	2	u	6	1911—Nov. 13, 13, 16, 16, 22, 26	9.9343±0.00045	4.9
10	9.9332±0.00050	65.4	Ep.	2	d	4	1910—Sept. 15, 16, 17; 1911—Sept. 6	9.9324±0.00051	3.8
11	9.9332±0.00057	44.4	Ep.	2	d	3	1911—Nov. 10, 22, 26	9.9335±0.00057	3.1
12	9.9328±0.00046	69.1	Bn.	2	u	7	1910—Sept. 16, 20; 1913—July 8, 10, 12, 16, 25	9.9318±0.00048	4.4
13	9.9310±0.00053	29.1	Bn.	2	u	5	1911—Feb. 24, Mar. 6, 8; 1912—Feb. 10; 1914—Mar. 12.	9.9321±0.00055	3.3
14	9.9334±0.00047	67.0	Bn.	2	d	7	1910—Sept. 15, 15, 16; 1913—July 8, 25, 26, 30	9.9325±0.00048	4.3
15	9.9320±0.00060	31.0	Bn.	2	d	4	1911—Feb. 28; Mar. 4, 8; 1914—Mar. 12	9.9330±0.00061	2.6
16	9.9353±0.00077	29.8	Hl.	2	d	3	1912—Feb. 22, 28; Mar. 1	9.9364±0.00078	1.7
17	9.9324±0.00076	66.2	Hl.	2	d	3	1912—July 30, Aug. 6, 6	9.9316±0.00076	1.7
18	9.9332±0.00066	65.4	Hl.	2	u	4	1912—July 26, 30, Aug. 5, 5	9.9324±0.00066	2.3
19	9.9318±0.00126	24.6	Hl.	2	u	1	1912—Mar. 1	9.9331±0.00127	0.6
20	9.9308±0.00040	38.4	Hl.	2	u	8	1911—Feb. 27, Mar. 1, 9; 1914—Mar. 13, 20, 24, Apr. 9, 10.	9.9314±0.00040	6.1
21	9.9337±0.00036	70.8	Hl.	2	u	9	1913—July 7, 16, 16, 28, 28, 29, Aug. 9, 14; 1914—Mar. 26.	9.9326±0.00038	7.0
22	9.9339±0.00039	39.0	Hl.	2	d	8	1911—Feb. 27, Mar. 1, 11; 1914—Mar. 13. 20, 24, Apr. 9, 10.	9.9345±0.00040	6.4
23	9.9351±0.00050	71.0	Hl.	2	d	4	1913—July 29, Aug. 9, 14; 1914—Mar. 26	9.9340±0.00052	3.7
24	9.9354±0.00080	68.8	Bn.	4	u	3	1912—Aug. 23, 27, Sept. 10	9.9344±0.00081	1.5
25	9.9304±0.00067	68.6	Bn.	4	d	5	1912—Aug. 24, 27, 29, Sept. 6, 12	9.9294±0.00068	2.1
26	9.9334±0.00100	68.5	Hl.	4	u	2	1913—Aug. 20, 26	9.9324±0.00100	1.0
27	9.9284±0.00133	46.2	Hl.	4	u	1	1912—Mar. 17	9.9286±0.00133	0.6
28	9.9358±0.00101	67.0	Hl.	4	d	2	1913—Aug. 16, 21	9.9349±0.00102	1.0
29	9.9308±0.00132	35.0	Hl.	4	d	1	1912—Mar. 22	9.9316±0.00133	0.6
30	9.9341±0.00094	57.9	Hl.	5	d	3	1910—Oct. 20, 22, 26	9.9337±0.00094	1.1
	[1] 9.9373	51.8	Ep.	2	d	1	1910—Mar. 3	[1] 9.9372	
	[1] 9.9363	72.8	Ep.	5	d	1	1910—Sept. 27	[1] 9.9351	
	[1] 9.9297	61.1	Ep.	5	u	1	1910—Sept. 29	[1] 9.9291	
	[1] 9.9366	59.6	Bn.	5	d	1	1910—Oct. 12	[1] 9.9361	
	[1] 9.9369	29.5	Bn.	5	u	1	1911—Feb. 10	[1] 9.9380	

[1] These values of *R* from observations of $\Delta\delta$ of the Perseus Pair were, through an oversight, omitted in deriving the definitive value of a revolution of Clark II for the period May 20, 1908–June 15, 1915.

Pleiades Pair, B. D. + 23° 495 and B. D. + 24°. 540

	R Observed	Th. F.	Obs.	Number Steps	Head Up or Down	Number Obsns.	Dates	R Reduced to 50° F.	Wt.
	″ ″	°						″ ″	
1	9.9309±0.00040	51.2	Bn.	1	u	6	1912—Sept. 20, 30, 30, Oct. 1; 1913—Dec. 15, 16	9.9308±0.00040	6.2
2	9.9297±0.00043	33.8	Bn.	1	u	5	1913—Jan. 22, 28, Feb. 7, 10, Dec. 20	9.9305±0.00044	5.1
3	9.9335±0.00041	52.3	Bn.	1	d	6	1912—Sept. 20, 30, 30, Oct. 1; 1913—Jan. 30, Dec. 16	9.9334±0.00041	6.1
4	9.9332±0.00043	34.4	Bn.	1	d	5	1913—Jan. 22, Feb. 6, 10, Dec. 15, 20	9.9340±0.00044	5.1
5	9.9325±0.00042	33.4	Hl.	1	u	5	1912—Feb. 28, Mar. 2, 2; 1913—Dec. 15, 19	9.9334±0.00044	5.2
6	9.9323±0.00040	34.0	Hl.	1	d	6	1912—Feb. 28, Mar. 2, 2; 1913—Dec. 15, 18, 19	9.9331±0.00041	6.0

Pleiades Pair, B. D.+24° 550 and B. D.+24° 552

	R Observed	Th. F.	Obs.	Number Steps	Head Up or Down	Number Obsns.	Dates	R Reduced to 50° F.	Wt.
	″ ″	°						″ ″	
1	9.9337±0.00101	52.8	Bn.	2	u	5	1912—Oct. 15, 26, 28, 29; 1913—Jan. 30	9.9336±0.00101	1.0
2	9.9341±0.00101	27.7	Bn.	2	u	5	1913—Feb. 1, 4, 5; 1914—Feb. 7, 24	9.9353±0.00102	1.0
3	9.9324±0.00101	51.8	Bn.	2	d	5	1912—Oct. 9, 26, 28, 29; 1913—Jan. 22	9.9323±0.00101	1.0
4	9.9320±0.00101	25.7	Bn.	2	d	5	1913—Feb. 1, 4, 6; 1914—Feb. 7, 24	9.9333±0.00102	1.0
5	9.9350±0.00088	25.6	Hl.	2	u	6	1912—Feb. 6, 8, 9; 1914—Feb. 9, 11, 12	9.9363±0.00090	1.2
6	9.9326±0.00079	26.0	Hl.	2	d	7	1912—Feb. 5, 8, 9, Mar. 7; 1914—Feb. 9, 11, 12	9.9339±0.00080	1.6

From the three pairs of stars the temperature coefficient c was found to be

$$c=+0''.0000525\pm0''.00000627$$

This is the increase in the value of R for a rise of 1° F. of the thermometer. With this coefficient and its probable error the observed values of R were reduced to 50° F. Then the three pairs of stars give respectively for the value of a revolution of the screw of Clark Micrometer II at 5 ° F.:

$$R=9''.9329\pm0''.00010$$
$$R=9.9325\pm0.00017$$
$$R=9.9342\pm0.00039$$

With each of the probable errors as just written is to be combined the probable error arising from the probable error of each $\Delta\delta$. As has been stated the values of $\Delta\delta$ for 1914.0 were taken as:

$$1115''.45\pm0''.052;\quad 658''.50\pm0.''10;\quad 590''.75\pm0''.15$$

In the case of each pair it was assumed that there was no relative proper motion in declination.

Then the final values of R from the three pairs of stars are:

$$R=9''.9329\pm0''.00047$$
$$R=9.9325\pm0.00152$$
$$R=9.9342\pm0.00255$$

Combining the three results according to their probable errors there is obtained:

$$R=9''.9329\pm0''.00044,\quad \text{for focal scale } 1^{in}.280,\quad \text{and } T=50°\text{ F.}$$

Also the temperature coefficient is

$$c=+0''.0000525\pm0''.00000627$$

this being the increase in the value of R for a rise of 1° F. of the thermometer.

The above value of R has been used from May 20, 1908, to June 15, 1915, the separators between the lenses being changed at the latter date.

For the observations taken during this period and printed in this volume the above mentioned value of R has been used, also it has been used for observations printed in the journals except as already specified. That is,

$$R=9''.9329+0''.0000525\ (T-50°\text{ F.})+0''.0255\ (1^{in}.280-\text{focal scale}) \qquad \text{(C)}$$

After the change of the separators between the lenses of the 26-inch equatorial on June 15, 1915, additional observations of $\Delta\delta$ by transits were taken in 1916

with Clark Micrometer II, using a bright field as before, and measuring the same three pairs of stars. No change was made in the values of $\Delta\delta$ assumed for 1914.0.

On a number of nights the movable threads were displaced or broken, apparently by the buckling of the plate which carries the fixed threads. Therefore, it may be that there was some displacement of a movable thread which was not noticed by the observer.

The observations of 1916 may be tabulated as follows, for the reading $1^{in}.220$ of the focal scale:

Perseus Pair, R from Observations of $\Delta\delta$ by Transits

	R Observed	Th. F.	Obs.	Number Steps	Head	Number Obsns.	Dates
	″ ″	°					
1	9. 9366±0. 00095	37. 2	Bn.	5	rt	3	1916—Nov. 16, 18, 21.
2	9. 9357±0. 00057	37. 3	Bn.	2	rt	3	1916—Nov. 16, 18, 21.
3	9. 9351±0. 00038	52. 6	Hl.	2	u	9	1916—Sept. 30, Oct. 17, 23, 24, 28, Nov. 1, 7, 11, 20.
4	9. 9341±0. 00115	50. 8	Hl.	5	u	2	1916—Nov. 7, 11.
5	9. 9358±0. 00062	52. 0	Hl.	4	u	6	1916—Sept. 30, Oct. 17, 23, 24, 28, Nov. 1.
6	9. 9342±0. 00066	64. 2	Hl.	4	u	5	1916—Sept. 23, 26, 28, Oct. 4, 6.
7	9. 9353±0. 00047	65. 2	Hl.	2	u	5	1916—Sept. 23, 26, 28, Oct. 4, 6.

Pleiades Pair, B. D. +23° 495 and B. D. +24° 540

	R Observed	Th. F.	Obs.	Number Steps	Head	Number Obsns.	Dates
	″ ″	°					
1	9. 9329±0. 00036	49. 5	Hl.	1	u	8	1916—Sept. 30, Oct. 17, 24, Nov. 1, 3, 7, 11, 20.
2	9. 9327±0. 00037	60. 5	Hl.	1	u	7	1916—Sept. 23, 23, 25, 26, Oct. 4, 6, 19.
3	9. 9305±0. 00098	48. 1	Hl.	2	u	3	1916—Nov. 7, 11, 20.
4	9. 9342±0. 00101	40. 4	Bn.	2	u	3	1916—Nov. 10, 16, 21.

Pleiades Pair, B. D. +24° 550 and B. D. +24° 552

	R Observed	Th. F.	Obs.	Number Steps	Head	Number Obsns.	Dates
	″ ″	°					
1	9. 9358±0. 00079	49. 1	Hl.	2	u	5	1916—Sept. 30, Oct. 23, 24, Nov. 1, 3.
2	9. 9339±0. 00100	59. 1	Hl.	2	u	3	1916—Sept. 25, 26, Oct. 4.

Combining groups *1, 2, 3, 4, 5* of the Perseus Pair,

$$(a)\quad R=9''.9354\pm0''.00026 \quad \text{at } 48°.0 \text{ F.}$$

and from groups *6* and *7*,

$$(b)\quad R=9''.9349\pm0''.00038 \quad \text{at } 64°.9 \text{ F.}$$

Combining groups *1, 3, 5* of the first Pleiades Pair,

$$(c)\quad R=9''.9328\pm0''.00032 \quad \text{at } 48°.4 \text{ F.}$$

Group *2* gives

$$(d)\ R=9''.9327\pm0''.00037 \quad \text{at } 60^\circ.5 \text{ F.}$$

By an intercomparison of the results (*a*), (*b*), (*c*), (*d*) as just written and taking account of the two groups of the second Pleiades Pair as tabulated is obtained the temperature coefficient

$$c=-0''.0000180\pm0''.0000202$$

to be added algebraically to the value of R for a rise of the thermometer of 1° F.

Then, reducing the observed values of R as tabulated to 50° F., the three pairs of stars give, respectively:

$$R=9''.9354\pm0''.00023$$
$$R=9.9328\pm0.00026$$
$$R=9.9352\pm0.00062$$

With the above probable errors are to be combined the probable errors of each $\Delta\delta$; that is, $\pm0''.052$, $\pm0''.10$, $\pm0''.15$, giving

$$R=9''.9354\pm0''.00052$$
$$R=9.9328\pm0.00153$$
$$R=9.9352\pm0.00260$$

and finally

$$R=9''.9351\pm0''.00048$$

for 50° F. and focal setting $1^{in}.220$.

After the separators between the lenses were changed the Clark Micrometer II was used only occasionally, when it was necessary to remove the Repsold micrometer from the instrument.

After 1915, June 15, the value of R as used was:

$$R=9''.9351+0''.0000525\ (T-50^\circ \text{ F.})+0''.0255\ (1^{in}.220-\text{focal scale}) \text{ .... (D)}$$

that is, the temperature coefficient of the value (C) was employed, as it had been determined from a long series of observations.

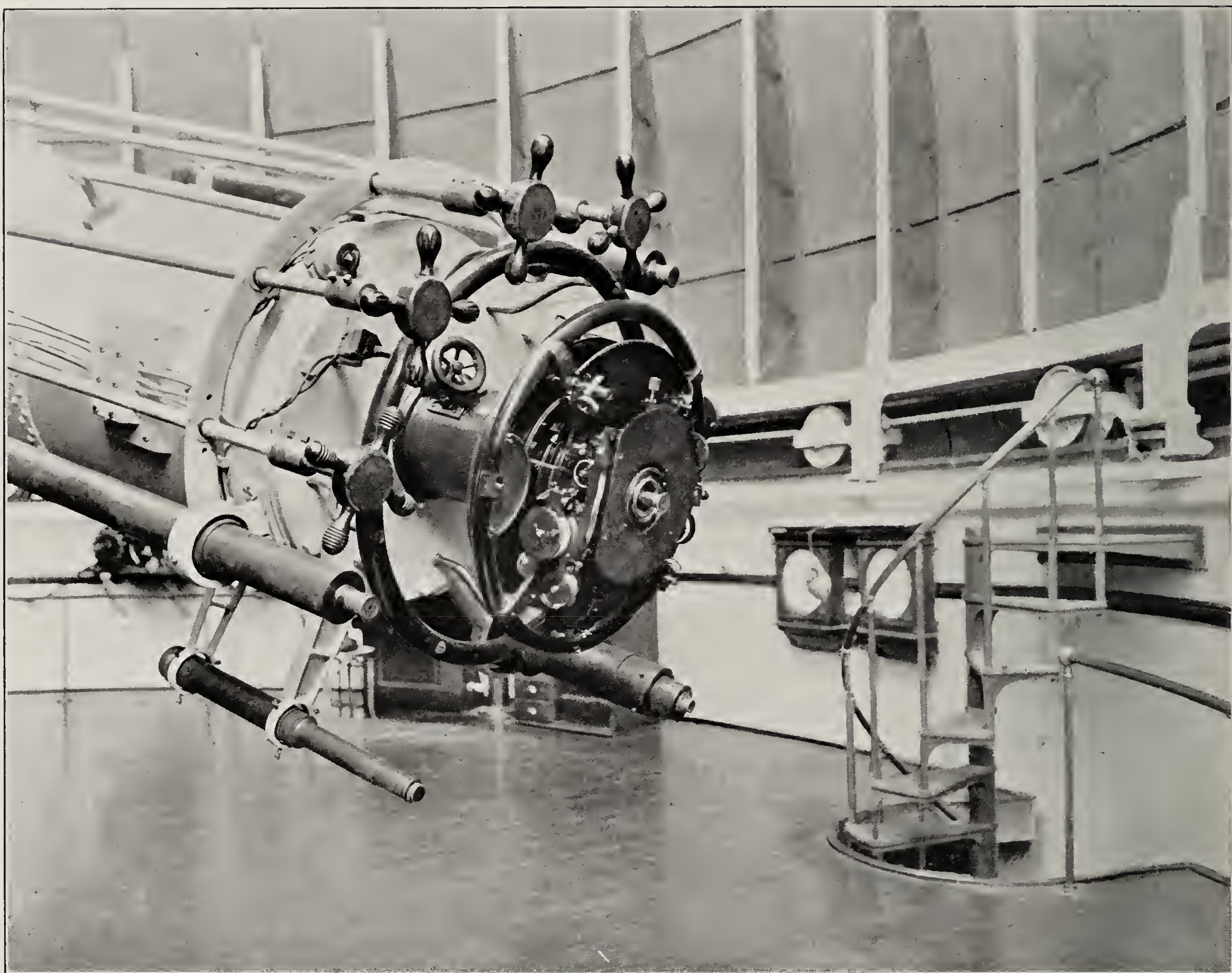
For 50° F. the value (C) of R before change of separators was $9''.9329$ for the focal setting $1^{in}.280$. Reduced to $1^{in}.220$, for comparison with the determination (D), this result is $9''.9344$. Therefore, by changing the separation of the lenses the focal length of the telescope was shortened $0^{in}.027$.

(5) *The position circle of Clark Micrometer II.*—This position circle is used also with the Warner and Swasey micrometer. The circle is on a plate which is attached to a cylinder, and this cylinder forms the outer sleeve of either of the micrometers just mentioned.

The circle is divided to 0°.5. By the aid of two small reading glasses the verniers are read directly to 0°.02, and estimated to 0°.01. It is not possible to clamp the micrometer quite firmly in position angle. From this cause any setting in position angle is subject to a probable error which is estimated to be ±0°.005.

In order to avoid applying corrections for eccentricity both verniers were read by all the observers except Frederickson.

On December 5, 1911, the sleeves and collars of Clark Micrometer II were taken apart by the instrument maker, and were found to be gummed. When the micrometer was assembled the verniers were interchanged; that is, Vernier I came opposite position circle divisions which before this date had been read by Vernier II.



THE EYE END OF THE 26-INCH EQUATORIAL WITH THE REPSOLD MICROMETER

THE WARNER AND SWASEY MICROMETER OF THE 26-INCH EQUATORIAL

Nothing in addition to the investigation given in Volume VI of the Naval Observatory Publications, Second Series, pages Axvii and seq., has been done in the way of examining the screw of the Warner and Swasey micrometer. From the measures printed in Volume VI the screw seems to be a good one.

In the winter of 1910–11 it was necessary to send away for repairs Clark Micrometer II, and to attach the Warner and Swasey micrometer to the 26-inch equatorial. A moderate number of observations were taken with it of the satellites of Saturn. There was not a good arrangement for lighting the spider threads, so that all the observations were made with bright field.

The screw of the Warner and Swasey micrometer is on one side of the box. Near the micrometer head the screw passes through the box, which serves as a nut. The other end of the screw butts against a hardened steel block which is adjustable in the direction of the screw. There is no spring. The slide carrying the movable threads moves like a nut on the screw.

From observations by Hall and Burton in two steps of the difference of declination of the Perseus stars A and Z in the cluster h Persei the value of a revolution was found to be

$$R=10''.5752$$

at the mean temperature 32° F., and with the focal scale set at $3^{in}.170$.

The value of R thus determined was used for the reduction of the 1910–11 observations of the satellites of Saturn. No corrections were applied for periodic or progressive errors.

For the determination of R the stars were allowed to transit across the field, and the pointings were taken at the long fixed thread in the middle of the field. The observations follow. For 1914.0 $\Delta\delta$ was taken as $1115''.45$.

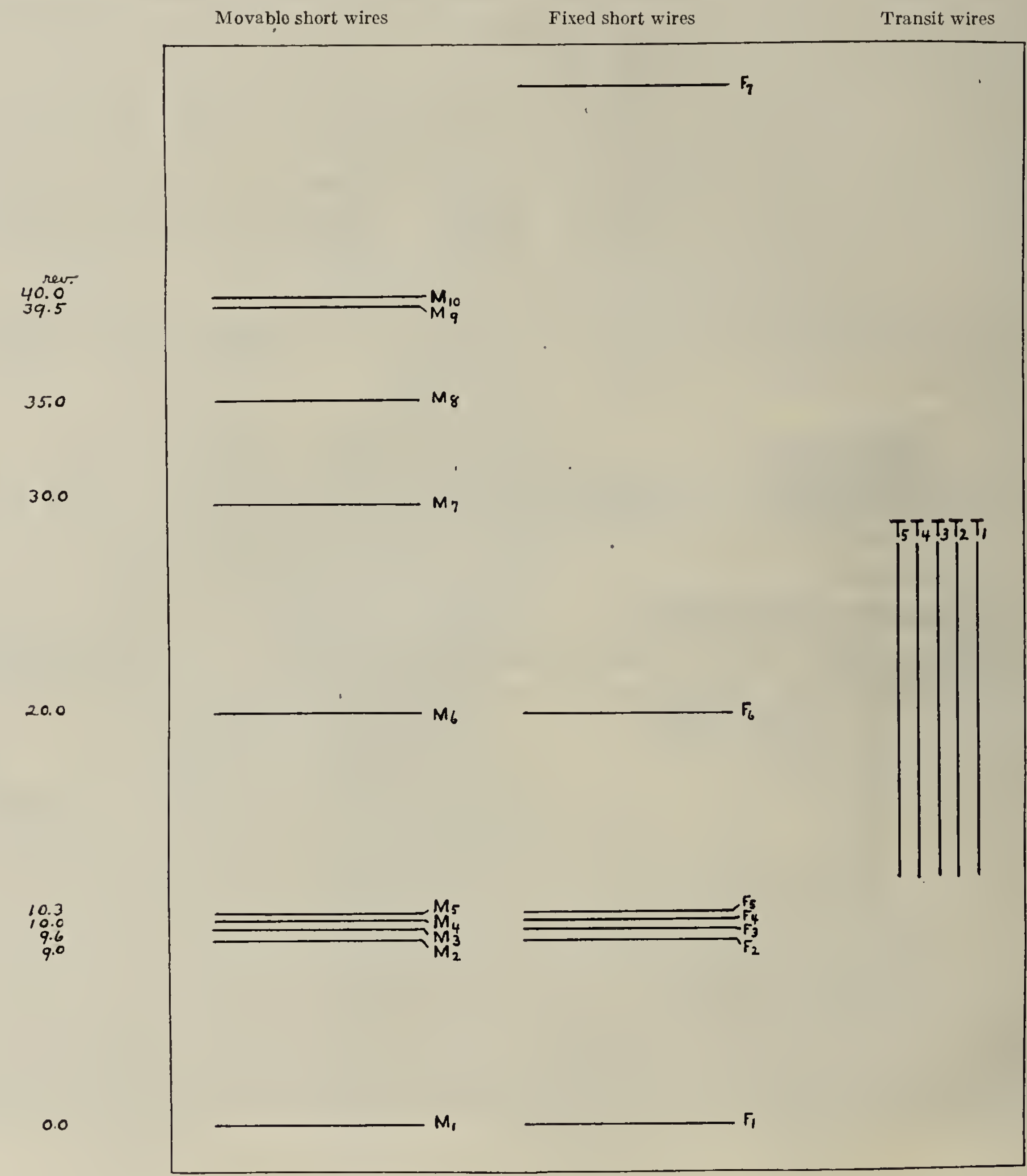
Date	R Observed	Date	R Observed
1910	"	1910	"
Dec. 30	10. 5766	Dec. 30	10. 5719
30	10. 5757		
1911		1911	
Jan. 4	10. 5768	Jan. 4	10. 5766
10	10. 5793	10	10. 5764
10	10. 5769	10	10. 5760
19	10. 5761	15	10. 5745
23	10. 5758	15	10. 5758
23	10. 5733	23	10. 5711
24	10. 5723	24	10. 5739
Mean-------	Hall=10. 5759	Mean-----	Burton=10. 5745

THE REPSOLD MICROMETER OF THE 26-INCH EQUATORIAL

In the session of Congress of 1910–11 the appropriation for apparatus and instruments for the Naval Observatory was increased in order to provide for the purchase of a new filar micrometer for the 26-inch equatorial.

The plans for this instrument were carefully considered by the Observatory staff, and it was ordered from C. L. Berger & Sons, of Boston, to be constructed by A. Repsold & Sons, of Hamburg. The micrometer was received August 2, 1913.

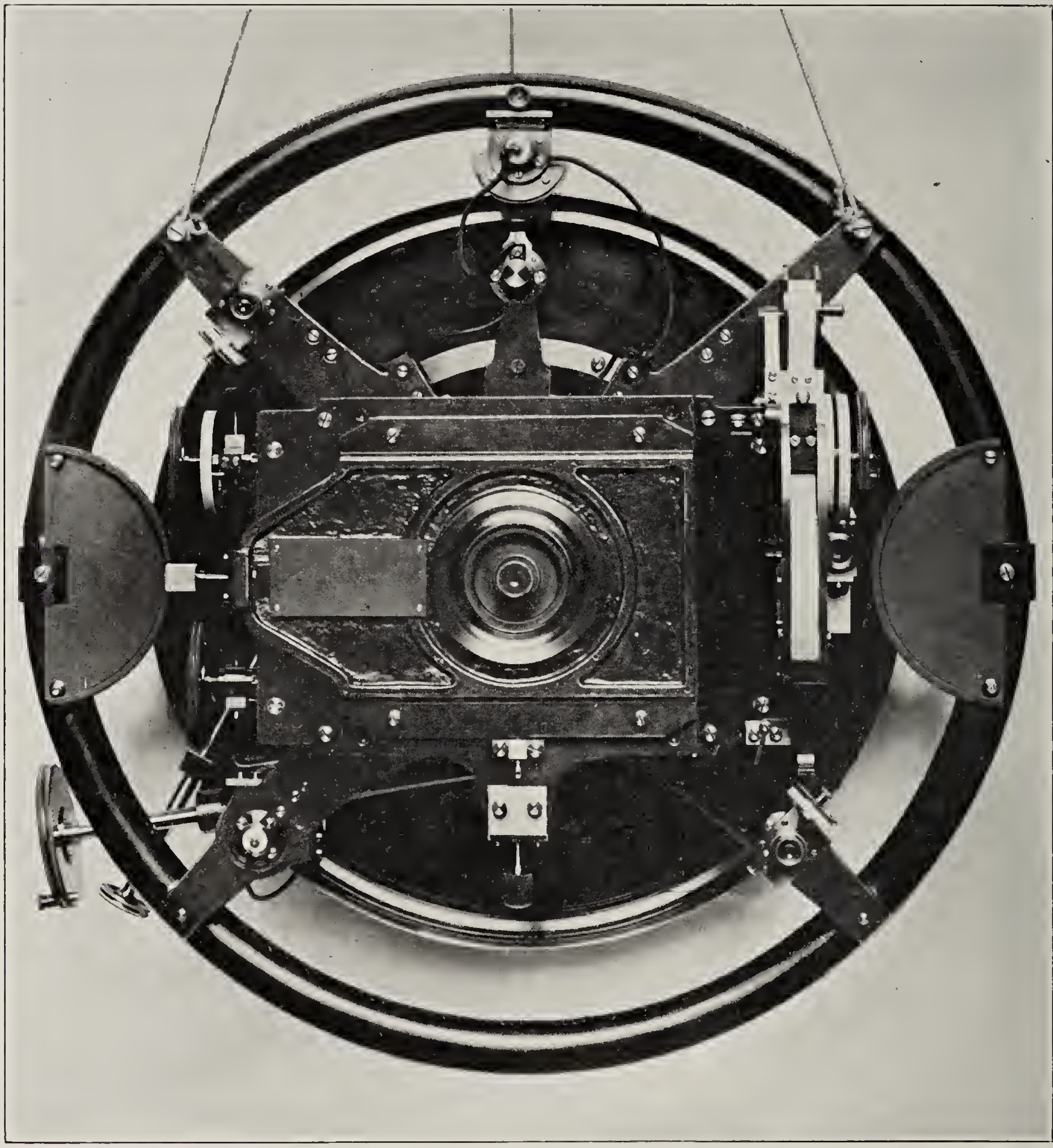
The new micrometer weighs 81 pounds, while the micrometer Clark II weighs 18 pounds. Therefore it seemed necessary to obtain a new tailpiece and draw tube. These parts were made at the Washington Navy Yard and received May 28, 1914. They are teel and weigh 65 pounds. The old tailpiece and draw tube are brass and weigh 36 pounds. At the navy yard was made also a new hand ring, larger



Scores of Repsold Micrometer

than the old one, to be attached to the end plate of the telescope in place of the old ring.

On account of the increased weight at the eye end it was necessary to fit two lead rings to the telescope tube, near the object-glass end, in order to balance the instrument. These rings are about 2½ feet from the object glass. The new micrometer was attached to the instrument June 30, 1914.



THE REPSOLD MICROMETER OF THE 26-INCH EQUATORIAL

The general characteristics of a Repsold filar micrometer are shown on page 529 of the Handbuch der Astronomischen Instrumentenkunde by L. AMBRONN. A brief description of the instrument constructed for the Naval Observatory is given by Dr. J. A. REPSOLD in the Astronomische Nachrichten, Nr. 5062.

The micromter is made of cast iron and steel. The position circle is of platinum and iridium, about 16 inches in diameter, and graduated to 0°.1. There are two low-power microscopes with which 0°.01 can be estimated easily and quickly. For special purposes the circle can be read to 0°.0001 by means of the micrometer screws of the microscopes.

The field of the micrometer is 75 by 45 mm. The eyepiece has a double slide. One revolution of the micrometer screw equals 1 mm., approximately, or about 20″.8. The extent of the motion of the middle moveable wire is 40 mm. For the spider lines scores are cut in nickel strips which are let into the cast-iron plates.

(1) *Scores of the Repsold micrometer.*—M_1 and F_1 are the movable and fixed wire scores nearest the micrometer head. The micrometer reading increases as the movable wires approach the head. When the coincidence of M_6 and F_6 is 20.0 revolutions and the head which changes the coincidence is set at zero, as in the case of the progressive error investigation, the coincidences of the movable wires with F_6 are as given at the left of the line which indicates the position of the score.

The intervals in revolutions between the fixed wire scores are:

$F_1-F_2=9.0$	$F_3-F_4=0.4$	$F_5-F_6=9.7$
$F_2-F_3=0.6$	$F_4-F_5=0.3$	$F_6-F_7=30.0$

The intervals between the scores for movable and fixed short wires are shown on the same scale.

The transit wire scores are 4½ mm. apart and are represented on about ⅔ the scale used for short wire scores.

The short wires are 45+mm. in length and the transit wires 75+mm., both dimensions represented on about ⅔ the scale used for short wire scores.

The heads of the micrometer screw are celluloid. There are also two steel printing wheels carrying raised figures, so that both the whole revolution and the decimal part can be impressed on a Morse fillet. The printing wheels are mounted on a shoulder fixed to the micrometer box. No pressure is exerted on the micrometer screw when the impressions are made. Thus a setting of the micrometer screw can be read in the ordinary way, or can be impressed on the Morse fillet.

The spring against which the micrometer screw works is carried on a separate slide rod. The office of the spring is to push the end of the micrometer screw which is opposite the heads against a jewel set in the end of a cylindrical plug. This plug can be moved through half a micrometer revolution, thus changing the coincidence of a fixed and movable wire by that amount.

It is necessary to observe with the micrometer head down or horizontal when the box screw is used. Otherwise, the weight of the heavy micrometer box can not be moved by the spring against which the box screw works. The heads of the box screw and micrometer screw are symmetrically situated on opposite sides of the micrometer box. The two screws are of the same pitch, and the heads by which these screws are turned are of the same size.

The micrometer is provided with an eyepiece microscope of about 60 magnifying power, and there is a suitable arrangement of movable threads for determining

the periodic and progressive errors of the screw. The eyepiece slides can be clamped when the microscope is used.

The bright field illumination has been described on page 9.

As to the bright wires, special care was taken by the REPSOLDS to make the illumination symmetrical. One 3.8-volt, 2-candlepower, small Mazda lamp furnishes light for both the long and short wires. The light passes through three thin plates of colored glass set in an ebonite ring. A brass shutter with little windows revolves about the ring, so as to give light for the short wires, or for the long wires, or for all the wires. To change the color of the threads the ebonite ring is changed. The light for the threads goes through lenses, two being used for the short threads and one for the long threads. After leaving the lenses light for the short threads is reflected by two mirrors, one at each end of the long axis of the micrometer box. There is a window in each end of the box for the passage of the light. The mirrors are mounted on the hand ring by which a rapid motion in position angle is given to the micrometer.

For the long wires the light passes through a lens mounted in the sleeve of the micrometer and is reflected back and forth by mirrors mounted inside the sleeve.

A crushed carbon rheostat is placed at the eye end of the micrometer for the control of the illumination of the bright wires. The heads of the micrometer screw are lighted from the lamp that illuminates the threads, by means of a mirror placed underneath the lamp. The current can be short-circuited around the rheostat, so as to brighten the lamp for an instant, for reading the heads.

A second small lamp, of the same voltage and candlepower as the first, furnishes light for the two microscopes by which the position circle is read.

The two small lamps on the micrometer are in parallel. Current is furnished from contact rings against which two brushes rub.

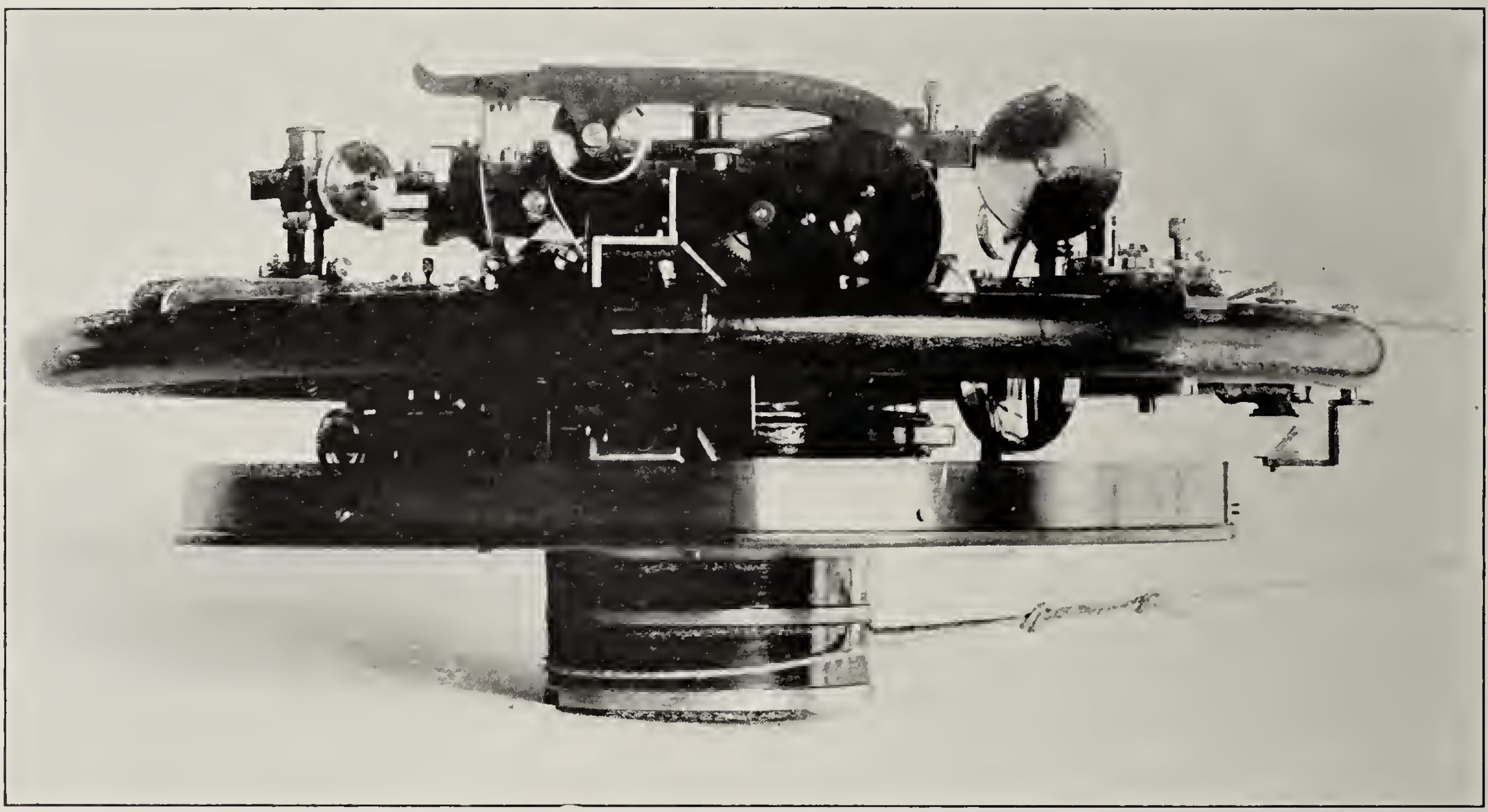
August 10, 1917, all the currents on the instrument except the chronograph circuit were taken from two small transformers, and this arrangement has been used continuously since that date to step down the commercial 110-volt alternating current. The chronograph circuit is 12 volts, furnished from storage batteries.

October 11, 1920, the tangent motion of the micrometer in position angle was modified by Mr. J. RHEINBOLD, so as to have the tangent screw work against a spring held in a box. March 25, 1921, Mr. RHEINBOLD attached phosphor bronze springs to the brushes which carry current to the micrometer lamps.

With the Repsold micrometer were furnished three Kellner eyepieces, each provided with a reversing prism. The respective equivalent focal lengths of these eyepieces are approximately 1 inch, ¾ inch, ½ inch, corresponding to magnifying powers of 390,520,779 diameters.

(2) *Investigation of the errors of the screw of the Repsold micrometer.*—By means of the eyepiece microscope a preliminary examination of the screw was made in 1913. The micrometer was placed on a bench, and light was reflected from a mirror and passed through a ground-glass plate underneath the micrometer, to light the threads.

The periodic error.—With the eyepiece microscope the screw of the Repsold micrometer was examined by HALL, BURTON, WATTS, and BOWER for periodic error. The micrometer was on the telescope and the field was lighted by skylight. The pairs of movable threads used were approximately $0^R.3$ and $0^R.5$, apart.



SIDE VIEW OF THE REPSOLD MICROMETER

With the pair of wires $0^R.5$ apart the periodic error was found to be:

1. 1913, November 19 to 26:

$$+0^R.0001 \cos u + 0^R.0001 \sin u - 0^R.0000 \cos 2u + 0^R.0004 \sin 2u$$

2. 1915, November 1 to 13:

$$+0^R.0000 \cos u - 0^R.0000 \sin u$$

3. 1921, October 13 to 27:

$$-0^R.0001 \cos u + 0^R.0000 \sin u$$

With the pair of wires $0^R.3$ apart was obtained:

4. 1921, October 20 to November 4:

$$-0^R.0000 \cos u - 0^R.0002 \sin u + 0^R.0001 \cos 2u + 0^R.0000 \sin 2u$$

As usual, the determinations were made by measuring in terms of the screw and at different parts of it the interval between the pair of threads employed. Thus, in *3*, above, observed by Bower, 11^R, 12^R, 20^R, 21^R, 30^R, 31^R were the starting points, and beginning with each $^1/_{10}$ of a revolution the thread interval was measured in terms of the screw, going forward and back through each revolution. In terms of the screw the interval between the threads was found to be:

from 11^R and 12^R, interval $=0^R.4872$
20 and 21 , $\quad = 0\ .4874$
30 and 31 , $\quad = 0\ .4873$

The observed quantities for determining the periodic error, the computed periodic error, and the residuals in the sense observed minus computed are exhibited as follows, the unit being $0^R.0001$. The observed quantities are the intervals as read at each $^1/_{10}$ of a revolution minus the respective intervals as given above.

	^{R} 0.0	^{R} 0.1	^{R} 0.2	^{R} 0.3	^{R} 0.4	^{R} 0.5	^{R} 0.6	^{R} 0.7	^{R} 0.8	^{R} 0.9
$11^R.0-11^R.9$	-5^5	-5^5	-0^5	$+2$	-0^5	$+2$	-0^5	-0^5	$+2$	$+2$
$12\ .0-12\ .9$	-3	-5^5	$+2$	-0^5	-3	-0^5	-0^5	-10^5	$+2$	-0^5
$20\ .0-20\ .9$	-3	-3	-0^5	$+2$	$+7$	$+2$	$+4^5$	$+2$	$+4^5$	$+2$
$21\ .0-21\ .9$	-0^5	-5^5	$+4^5$	-3	$+2$	-0^5	$+4^5$	-0^5	-5^5	$+2$
$30\ .0-30\ .9$	$+2$	-8	-0^5	$+2$	-3	$+4^5$	$+2$	$+4^5$	-3	-0^5
$31\ .0-31\ .9$	-8	-0^5	-0^5	$+4^5$	$+2$	$+2$	$+2$	$+4^5$	-3	-0^5
Observed means	-3	-5	$+1$	$+1$	$+1$	$+2$	$+2$	0	0	$+1$
Comp. periodic error	-1	-1	0	0	$+1$	$+1$	$+1$	0	0	-1
O−C	-2	-4	$+1$	$+1$	0	$+1$	$+1$	0	0	$+2$

The determination *4* of the periodic error was by HALL. The revolutions used were $3^R.0-3^R.9$, $5^R.0-5^R.9$, $14^R.0-14^R.9$, $21^R.0-21^R.9$, and $29^R.0-29^R.9$ The mean value of an interval was found to be $0^R.30474$. The results are:

	R 0.0	R 0.1	R 0.2	R 0.3	R 0.4	R 0.5	R 0.6	R 0.7	R 0.8	R 0.9
Observed means	$+0^5$	$+0^5$	-2^5	-8^5	$+1^5$	-1^5	$+2^5$	$+0^5$	-0^5	$+6^5$
Comp. periodic error	$+1$	-1	-2^5	-2^5	-1	$+1$	$+1^5$	$+1$	$+1$	$+1^5$
O−C	-0^5	$+1^5$	0	-6	$+2^5$	-2^5	$+1$	-0^5	-1^5	$+5$

In June and August, 1926, the periodic error of the screw of the Repsold micrometer was redetermined by HALL with the eyepiece microscope, the thread interval approximately equal to $\frac{1}{2}^R$ being measured by daylight in terms of the screw. The result was:

$$-\overset{R}{0}.0000 \cos u+\overset{R}{0}.0001 \sin u$$

The progressive errors.—The progressive errors were determined for every fifth revolution of the screw by the method used for a linear scale. The readings were made in 1915, 1917, and 1921 by HALL, BURTON, and BOWER. The micrometer was on the telescope, the eyepiece microscope was used, and the field was lighted from the sky.

The screw can be used through about 40 revolutions. Approximately $1^R=20''.8$. The space 5^R-35^R was taken as fundamental. The spaces were subdivided by means of threads on the movable slide arranged by the makers for that purpose, measures being taken of the thread intervals in terms of the micrometer screw. The measures were made symmetrically, forward and back, each result being the mean of eight readings. The probable error of the mean of eight determinations of a thread interval in terms of the screw is $\pm 0^R.0002$.

Examples of actual measures follow:

November 24, 1915, the fundamental space 5^R-35^R was bisected by means of the movable threads approximately 15^R apart, giving as results:

$$\overset{R}{14}.9904+(20)-\ (5)=\Delta$$
$$14.9894+(35)-(20)=\Delta$$

(20) is the error of 20^R, to be added algebraically to the micrometer reading. (5) and (35) have each been assumed zero. Then, the true value of the thread interval is $14^R.9899$ and $(20)=-0^R.0005$. The probable error of $(20)=\frac{2}{\sqrt{2}}$, and the weight of this determination is taken as 2. In the table of results for the progressive errors, page 38, the probable error of any one of the results is

$$\frac{2}{\sqrt{\text{wt. of determination}}}$$

November 30, 1915, the fundamental interval $5^R - 35^R$ was twice trisected with threads approximately 10^R apart, so that there were 16 determinations of each thread interval, giving as the means:

$$\begin{aligned}
\overset{R}{10.0017^5} + (15) - (5) &= \Delta \\
10.0005^5 + (25) - (15) &= \Delta \\
10.0021 + (35) - (25) &= \Delta
\end{aligned}$$

From these equations $\Delta = 10^R.0014^{2/3}$, $(15) = -3$, $(25) = +6$. (15) and (25) each has the weight 3, and the probable error of each is $\frac{2}{\sqrt{3}}$.

May 15, 1917, with the pair of threads 5^R apart, the spaces 5^R—15^R and $25^R - 35^R$ were bisected. The measures give the following results, each result for a thread interval being the mean of four determinations:

$$\overset{R}{4.9780} + (10) - (5) = \Delta, \qquad \overset{R}{4.9787^5} + (30) - (25) = \Delta$$
$$4.9780 + (15) - (10) = \Delta, \qquad 4.9787^5 + (35) - (30) = \Delta$$

Making use of the final values of (15) and (25), that is, -5 and $+3$, respectively, it is found that $(10) = -2^5$, $(30) = +1^5$, each with the weight 1 and the probable error ± 2.

May 15, 1917, the space $30^R - 40^R$ was bisected with the pair of threads approximately 5^R apart, giving:

$$\begin{aligned}
\overset{R}{4.9782^5} + (35) - (30) &= \Delta \\
4.9777^5 + (40) - (35) &= \Delta
\end{aligned}$$

Making use of the final value of (30), which is $+1^5$, it is found that $(40) = +3^5$, with a weight $\frac{1}{4}$ and a probable error ± 4.

No corrections have been applied for the progressive or periodic errors of the screw of the Repsold micrometer.

The following table exhibits the result of the determination of progressive errors, the coincidence of M_6 and F_6 being $20^R.0$, and the head which changes the coincidence being set at zero.

Progressive Errors of Repsold Micrometer. Unit $0^R.0001$

(0)				(10)				(15)				(20)				(25)				(30)				(40)			
Date	Obsr.		Wt.	Date	Obsr.		Wt.	Date	Obsr.		Wt.	Date	Obsr.		Wt.	Date	Obsr.		Wt.	Date	Obsr.		Wt.	Date	Obsr.		Wt.
1913																											
Nov. 28	Hl.	$+6^5$	¼					Nov. 28	Bn.	0	¾					Nov. 28	Bn.	-2^5	¾					Nov. 28	Hl.	+12	¼
28	Bn.	$+26^5$	¼																					28	Bn.	$+19^5$	¼
28	Hl.	+19	¼																					28	Hl.	$+19^5$	¼
1915																											
Nov. 12	Hl.	-3^5	½	Nov. 13	Hl.	−6	½	Nov. 30	Hl.	−3	3	Nov. 24	Hl.	−5	2	Nov. 30	Hl.	+6	3	Nov. 23	Hl.	0	½	Nov. 12	Hl.	-0^5	½
12	Hl.	+5	½	23	Hl.	$+1^5$	½	30	Hl.	+3	½	Dec. 26	Hl.	−2	2	30	Hl.	+5	½	30	Hl.	+1	2	12	Hl.	$+4^5$	½
13	Hl.	$+8^5$	½	30	Hl.	−9	2	Dec. 26	Hl.	−4	½									30	Hl.	+1	2	23	Hl.	−9	½
23	Hl.	+11	½	30	Hl.	−7	2																	24	Hl.	$+2^5$	½
24	Hl.	+6	½	Dec. 26	Hl.	−4	½																				
25	Hl.	+7	½																								
1917																											
May 16	Bn.	$+11^5$	1	Mar. 13	Bn.	−5	4	Mar. 12	Bn.	−4	3	Jan. 25	Hl.	−4	4	Mar. 12	Bn.	$+4^5$	3	May 15	B.	0	1	May 15	Hl.	$+3^5$	¼
16	Hl.	+18	½	May 15	B.	-2^5	1	12	Hl.	−12	3	Mar. 12	Bn.	-1^5	4	12	Bn.	+5	3	15	Hl.	$+1^5$	1	15	Hl.	-1^5	¼
24	Hl.	0	1	15	Hl.	-2^5	1	May 15	Bn.	−3	3	12	Hl.	−5	4	May 15	Bn.	+3	3	15	B.	-2^5	1	15	Hl.	+6	¼
26	Hl.	$+2^5$	¾	15	B.	−5	1	16	Bn.	−9	½	May 16	Bn.	−5	2	16	Bn.	$+2^5$	½	15	Hl.	$+6^5$	1	15	B.	-1^5	¼
				16	Bn.	−10	½	18	B.	−5	½	18	B.	−3	2	18	B.	+2	½	16	Bn.	0	½	17	Hl.	-0^5	½
				16	Hl.	-3^5	6	18	Hl.	+4	½	18	Hl.	−7	2	18	Hl.	+10	½	16	Hl.	$+2^5$	6	17	Hl.	−2	1
				29	Bn.	-6^5	3	18	B.	−6	3					18	B.	0	3	23	Hl.	$+3^5$	6				
								18	Hl.	−4	3					18	Hl.	+6	3	24	Hl.	−5	2				
1921																				29	B.	−1	2				
Nov. 5	B.	+4	¾																								
7	B.	+9	½	Nov. 5	B.	−5	½	Oct. 28	B.	−3	3	Oct. 28	B.	−4	2	Oct. 28	B.	+5	3	Nov. 5	B.	+1	½	Nov. 5	B.	+4	¾
10	B.	+4	½	10	B.	−5	½	Nov. 7	B.	−2	½	Nov. 5	B.	−3	2	Nov. 7	B.	−2	½	7	B.	+1	½	7	B.	+8	¾
10	B.	+9	½	10	B.	−6	½	10	B.	-7^5	½	7	B.	−9	2	10	B.	0	½	10	B.	0	½	10	B.	$+2^5$	¾
10	B.	+8	½	10	B.	−2	½					10	B.	−7	2					10	B.	$+2^5$	½	10	B.	$+4^5$	¾
												10	B.	−45	2												
12	Hl.	−6	½	15	Hl.	−6	2	Nov. 5	Hl.	−10	½	Nov. 5	Hl.	−1	2	Nov. 5	Hl.	+1	½	15	Hl.	+5	2	12	Hl.	+21	½
15	Hl.	$+17^5$	½	19	Hl.	+1	2	7	Hl.	−6	½	7	Hl.	−3	2	7	Hl.	+3	½	19	Hl.	$+1^5$	2	15	Hl.	-14^5	½
19	Hl.	$+2^5$	½	20	Hl.	-2^5	2	10	Hl.	−19	½	10	Hl.	0	2	10	Hl.	−7	½	20	Hl.	$+2^5$	2	19	Hl.	−12	½
20	Hl.	$+10^5$	½					11	Hl.	−3	½	11	Hl.	−4	2	11	Hl.	−3	½					20	Hl.	+13	½
								15	Hl.	−2	½	15	Hl.	$+0^5$	2	15	Hl.	+2	½								
								Nov. 5	B.	−5	½					5	B.	$+3^5$	½								
								10	B.	−5	½					Nov. 7	B.	+2	½								
								10	B.	−5	½					10	B.	$+2^5$	½								
								10	B.	−2	½					10	B.	0	½								
Mean, wt		+8	12¾			−5	36			−5	45¾			−4	42			+3	44¼			+1½	38			+3	10¼

In August, 1926, the screw of the Repsold micrometer was again examined for progressive errors by means of the eyepiece microscope. As before, suitable thread intervals were measured by daylight in terms of the micrometer screw, each result being the mean of four readings. The weights are homogeneous with those of the preceding table. The measures were by Hall.

The table of results follows, the coincidence of M_6 and F_6 being $20^R.0$, and the head which changes the coincidence being set at zero.

Progressive Errors of Repsold Micrometer, 1926. Unit $0^R.0001$

1926	(0)	Wt.	1926	(10)	Wt.	1926	(15)	Wt.	1926	(20)	Wt.	1926	(25)	Wt.	1926	(30)	Wt.	1926	(40)	Wt.
Aug. 24	+1	¼	Aug. 23	−8	1	Aug. 17	−10	¾	Aug. 17	−11	1	Aug. 17	+3	¾	Aug. 23	−6	1	Aug. 24	0	¼
26	+3	¼	24	−6	1	17	−21	¾	17	−7	1	17	−4	¾	24	−3	1	27	+1	¼
27	+2	¼	26	−3	1	23	−9	¾	23	−3	1	23	−2	¾	26	−4	1	27	+6	¼
29	+10	¼	29	−11	1	23	−5	¾	23	−5	1	23	−3	¾	27	+2	1	29	+12	¼
31	+4	¼	29	−7	1	24	−15	¾	24	−8	1	24	−13	¾	29	+1	1	31	−6	¼
						31	−2	¾				31	0	¾						
						31	−7	¾				31	−4	¾						
Mean, wt.	+4	1¼		−7	5		−10	5¼		−7	5		−3	5¼		−2	5		+3	1¼

(3) *Value of one revolution of the screw of the Repsold micrometer.*—The new Repsold micrometer was attached to the 26-inch equatorial June 30, 1914. It was necessary to remove it occasionally and use Clark Micrometer II in its place.

Before changing the separators between the lenses, on June 15, 1915, a few measures by transits with a bright field of the difference of declination of the arc $A-Z$ in Perseus were observed for a preliminary value of one revolution of the screw.

The results are tabulated below, reduced to the focal setting $0^{in}.810$. With a provisional temperature coefficient the values of R are also reduced to 50° F. The coefficient is

$$c = +0''.000066 \pm 0''.0000565,$$

which is the increase in the value of one revolution for a rise of 1° F. of the thermometer.

The value of $\Delta\delta$ of the stars $A-Z$ for 1914.0 was taken to be $1115''.45 \pm 0''.052$.

Perseus Pair, R from Observations of $\Delta\delta$ by Transits

	R Observed	Th. F.	Obs.	Number Steps	Dates	R Reduced to 50° F.	Wt.
	″ ″	°				″ ″	
1	20. 8423 ± 0. 00144	61. 3	Hl.	2	1914—Sept. 30, 30	20. 8421 ± 0. 00146	4. 7
2	20. 8354 ± 0. 00144	37. 7	Bn.	2	1915—Jan. 25, Mar. 10	20. 8357 ± 0. 00146	4. 7
3	20. 8357 ± 0. 00101	71. 4	Bn.	2	1914—Aug. 31, 31, Sept. 16, 23.	20. 8352 ± 0. 00109	8. 4

Then for 50° F.

$$R=20''.8372 \pm 0''.00075$$

Combining with this probable error the probable error assumed for the Perseus Pair, that is, $\pm 0''.052$, the result is

$$R=20''.8372 \pm 0''.00123$$

for 50° F. and focal setting $0^{in}.810$, before the separators between the lenses were changed on June 15, 1915.

After the insertion of new separators between the lenses of the object glass on June 15, 1915, measurements of differences of declination with bright field were made with the Repsold micrometer of the three pairs observed with Clark Micrometer II. The values of $\Delta\delta$ already assumed for 1914.0 were retained. These were:

1. For the Perseus Pair,

B. D.+56° 543 (8.2) and B. D.+56° 498 (8.6), $1115''.45 \pm 0''.052$

2. For the Pleiades Pair,

B. D.+23° 495 (8.3) and B. D.+24° 540 (8.0), $658''.50 \pm 0''.10$

3. And for the Pleiades Pair,

B. D.+24° 550 (8.8) and B. D.+24° 552 (9.1), $590''.75 \pm 0''.15$

From an examination of the pointings with a thread interval on the movable micrometer slide the probable error of a single measure of $\Delta\delta$ of two stars by means of the thread interval and the screw is $\pm 0^{R}.0081$. The probable error of the mean of five measures is $\pm 0^{R}.0036$. Any reading of the screw is supposed to have the probable error $\pm 0^{R}.0003$. The determination of a thread interval in terms of the screw is supposed to be without error.

The observed values of R are tabulated below in groups; each group is reduced to 50° F. with the temperature coefficient

$$c=+0''.000022 \pm 0''.0000191$$

determined from an intercomparison of the observations of the arcs. Also, each observed value of R is reduced to the reading $0^{in}.810$ of the focal scale.

Perseus Pair, R from Observations of Δδ by Transits

	R Observed	Th. F.	Obs.	Number Steps	Number Obsns.	Dates	R Reduced to 50° F.	Wt.
	″ ″	°					″ ″	
1	20. 8213±0. 00331	36. 5	Hl.	5	1	1917—Jan. 2	20. 8216±0. 00332	0. 9
2	20. 8335±0. 00080	29. 6	Hl.	2	7	1916—Dec. 6, 13; 1917—Jan. 11, 19, 19, 26, Feb. 21.	20. 8339±0. 00089	12. 5
3	20. 8358±0. 00080	69. 8	Hl.	2	8	1916—July 29, Aug. 9, 16, 16, 19, 26, Sept. 9, 16.	20. 8354±0. 00089	12. 7
4	20. 8370±0. 00101	68. 5	Hl.	4	13	1915—Aug. 23, Sept. 1, 3, 13, 14, 23, 24; 1916—Aug. 9, 16, 19, 26, Sept. 9, 16.	20. 8366±0. 00107	8. 7
5	20. 8346±0. 00060	73. 5	Bn.	2	12	1915—June 28, July 24, Aug. 13, 14; 1917—July 23, 28, Aug. 1, 1, 28, 28, Sept. 1, 1.	20. 8341±0. 00075	17. 8
6	20. 8362±0. 00070	42. 0	Bn.	2	9	1916—Dec. 13; 1917—Jan. 20, Feb. 7, 17, 17, Mar. 10, 15, Sept. 11, 11.	20. 8364±0. 00072	19. 5

Pleiades Pair, B. D. +23° 495 and B. D. +24° 540

	R Observed	Th. F.	Obs.	Number Steps	Number Obsns.	Dates	R Reduced to 50° F.	Wt.
	″ ″	°					″ ″	
1	20. 8345±0. 00152	71. 5	Hl.	2	6	1915—Sept. 10, 15; 1917—Aug. 3, 18, 20, 24.	20. 8340±0. 00157	4. 0
2	20. 8312±0. 00158	51. 6	Hl.	2	5	1915—Sept. 22, Oct. 11, 21, 23, Dec. 2.	20. 8312±0. 00158	4. 0
3	20. 8341±0. 00178	43. 4	Hl.	1	1	1916—Dec. 2	20. 8342±0. 00179	3. 1
4	20. 8264±0. 00178	39. 2	Bn.	2	4	1915—Nov. 24, 27, 30; 1917—Jan. 20.	20. 8266±0. 00179	3. 1
5	20. 8343±0. 00175	63. 2	Bn.	2	4	1917—Aug. 3, Sept. 1, 11, 13.	20. 8340±0. 00177	3. 2

Pleiades Pair, B. D. +24° 550 and B. D. +24° 552

	R Observed	Th. F.	Obs.	Number Steps	Number Obsns.	Dates	R Reduced to 50° F.	Wt.
	″ ″	°					″ ″	
1	20. 8279±0. 00192	55. 4	Hl.	2	4	1915—Oct. 12, 12, 21, 23	20. 8278±0. 00192	2. 7
2	20. 8320±0. 00195	70. 0	Hl.	2	4	1917—Aug. 3, 18, 20, 24	20. 8316±0. 00199	2. 5
3	20. 8302±0. 00192	63. 2	Bn.	2	4	1917—Aug. 3, Sept. 1, 11, 13.	20. 8299±0. 00194	2. 7
4	20. 8308±0. 00190	38. 8	Bn.	2	4	1915—Nov. 27, 30; 1917—Oct. 31, Nov. 2.	20. 8310±0. 00191	2. 7

The three pairs give

$$R=20.8351''\pm0.00037''$$
$$R=20.8321\pm0.00076$$
$$R=20.8300\pm0.00097$$

Compounding with the probable errors just written the probable errors of the respective $\Delta\delta$'s there result

$$\begin{array}{c} '' \\ \pm 0.00103 \\ \pm 0.00325 \\ \pm 0.00538 \end{array}$$

Then the value of a revolution is

$$R = 20''.8347 \pm 0''.00097$$

for 50° F. and the reading $0^{\text{in}}.810$ of the focal scale.

The temperature coefficient is

$$c = +0''.000022 \pm 0''.0000191$$

which is the change in the value of R for a rise of 1° F. of the thermometer.

Then, for the reduction of observations taken after June 15, 1915, the value of R employed has been

$$R = 20''.8347 + 0''.000022\ (\mathrm{T} - 50°\ \mathrm{F.}) + 0''.0535\ (0^{\text{in}}.810 - \text{focal scale})$$

As there were only a few observations taken for the screw value of the Repsold micrometer before the change of the separators between the lenses, the value of R last found, $20''.8347$, was corrected for the change caused by the separators of $0^{\text{in}}.027$ in the focal length shown by the two series of observations for the screw of Clark Micrometer II. This correction is $-0''.0014$, making the preceding value of R,

$$R = 20''.8333 \pm 0''.00097$$

for focal scale reading $0^{\text{in}}.810$. Combining with this the value

$$R = 20''.8372 \pm 0''.00172$$

obtained before the change of separators is found

$$R = 20''.8348 \pm 0''.00076$$

for scale reading $0^{\text{in}}.810$, or

$$R = 20''.8332 \pm 0''.00076$$

for scale reading $0^{\text{in}}.840$ and temperature 50° F.

This result, $R = 20''.8332$, was used for the reduction of observations made before the change of separators, with the temperature coefficient

$$c = +0''.000027 \pm 0''.0000182$$

found by combining the temperature coefficients determined before and after the change of separators.

In 1919, 1920, 1921, 1923, and 1924 observations near the meridian were made with bright field of transits of equatorial stars across the short micrometer wires, to determine the value of a revolution of the micrometer screw. The observers were Hall, Burton, and Bower. From a discussion by Burton the results, reduced to 50° F. and the focal setting $0^{\text{in}}.810$, are

Obsr.	Interval	R Observed	Interval	R Observed
	s	″ ″	s	″ ″
Hl.	85	20. 8314±0. 0006	42	20. 8355±0. 0013
Bn.	85	20. 8352±0. 0005	27	20. 8398±0. 0025
B.	78	20. 8356±0. 0006	39	20. 8433±0. 0011

The values found from the short intervals seem to differ systematically from those determined from the long intervals.

Uniting the results of each observer according to the respective probable errors,

Obsr.	R Observed
	″ ″
Hl.	20. 8321±0. 0005
Bn.	20. 8354±0. 0005
B.	20. 8374±0. 0005

and for the mean of the three observers

$$R=20''.8350\pm0''.0003$$

for 50° F. and the focal setting $0^{\text{in}}.810$.

(4) *Eccentricity of the position circle of the Repsold micrometer.*—With the Repsold micrometer, as with the Clark Micrometer II, both microscopes were read, or verniers in the case of Clark II, in order to avoid applying a correction for eccentricity.

Soon after the Repsold micrometer was received the circle was examined, in order to be sure that the eccentricity was small.

Determinations of the eccentricity were made by Hall and Watts July 22.5, 1914, and by Bower October 18.1 and 19.2, 1921. These readings were reduced by Bower by the usual formula

$$\alpha+\cos Z\left(2\frac{e}{r}\sin E\right)+\sin Z\left(\frac{2e}{r}\cos E\right)=n_c$$

The readings were treated in the sense microscope B minus microscope A. Microscope A is near the micrometer heads. It is adjustable in the direction of the circle reading, so as to make the two microscopes 180° apart. This adjustment was made after the readings taken on July 22.5, 1914.

The two determinations of eccentricity are as follows, the unit being 0°.0001; n_0 is the mean of the readings (B−A), which are taken symmetrically, forward and back.

Hall and Watts, observers						Bower, observer. T.=66° F.					
Z	n_o	$n \cos Z$	$n \sin Z$	n_c	(O−C)	Z	n_o	$n \cos Z$	$n \sin Z$	n_c	(O−C)
°						°					
0	+437	+437.0	0.0	+437	0	0	−18	−18.0	0.0	−19	+1
30	428	+370.6	+214.0	+417	+11	30	−45	−39.0	−22.5	−43	−2
60	389	+194.5	+336.9	+402	−13	60	−68	−34.0	−58.9	−63	−5
90	401	0.0	+401.0	+396	+5	90	−65	0.0	−65.0	−72	+7
120	399	−199.5	+345.5	+399	0	120	−65	+32.5	−56.3	−69	+4
150	420	−363.7	+210.0	+412	+8	150	−58	+50.2	−29.0	−54	−4
180	413	−413.0	0.0	+430	−17	180	−30	+30.0	0.0	−31	+1
210	460	−398.4	−230.0	+449	+11	210	−11	+9.5	+5.5	−7	−4
240	457	−228.5	−395.8	+464	−7	240	+21	−10.5	−18.2	+13	+8
270	485	0.0	−485.0	+471	+14	270	+22	0.0	−22.0	+22	0
300	456	+228.0	−394.9	+467	−11	300	+11	+5.5	−9.5	+19	−8
330	+454	+393.2	−227.0	+455	−1	330	+9	+7.8	−4.5	+4	+5
Sums	5,199	+20.2	−225.3		0	Sums	−297	+34.0	−280.4		+3
$\alpha=+433.2$		$\frac{e}{r}=18.8$		$E=174°.9$		$\alpha=-24.8$		$\frac{e}{r}=23.5$		$E=173°.1$	

Bower, observer T.=69°.5 F.					
Z	n_o	$n \cos Z$	$n \sin Z$	n_c	(O−C)
°					
0	−28	−28.0	0.0	−31	+3
30	−65	−56.3	−32.5	−61	−4
60	−84	−42.0	−72.7	−82	−2
90	−86	0.0	−86.0	−88	+4
120	−77	+38.5	−66.7	−79	+2
150	−54	+46.8	−27.0	−56	+2
180	−30	+30.0	0.0	−25	−5
210	+3	−2.6	−1.5	+4	−1
240	+30	−15.0	−26.0	+25	+5
270	+26	0.0	−26.0	+32	−6
300	+22	+11.0	−19.1	+22	0
330	+2	+1.7	−1.0	−1	+3
Sums	−341	−15.9	−358.5		−1
$\alpha=-28.4$		$\frac{e}{r}=29.9$		$E = 182°.5$	

In the first determination by Bower the telescope was west of the pier, object glass north, and the 5° mark on the circle was straight down. In his second determination the telescope was east of the pier, object glass north, and the 185° mark on the circle was straight down. The box screw was turned up.

In the above results microscope B minus microscope A $=180°+\alpha$, or $(B-A)=180°+\alpha$. E is the position on the circle of the line joining the center of the circle to the center of the microscopes, r is the radius of the circle, and e is the distance from the center of the circle to the center of the microscopes.

THE INSTRUMENTAL CONSTANTS OF THE 26-INCH EQUATORIAL

Instrumental constants with Clark Micrometer II.—The notation for the instrumental constants is that given in Appendix III, Volume IV, Publications of the Naval Observatory, Second Series. During the period October 20, 1908 to March 24, 1914, the constants were determined according to the methods given in the appendix referred to. Clark Micrometer II was attached to the instrument during this period. The constants are

η = the distance of the instrumental pole westward from the true pole, measured along the six-hour circle.

ξ = the distance of the instrumental pole above the true pole, measured along the meridian.

i_1 = the inclination of the axes. The angle between the polar axis produced northward and the declination axis produced through the telescope tube is $i_1+90°$. This is the observed angle as affected by the flexure of the declination axis.

i_1 as here defined equals the i_1 of Chauvenet, who takes $i_1=i-\epsilon \sin \phi$, $90°-i$ being the angle between the polar axis produced northward and the declination axis produced away from the tube, not including the effect of the flexure of the declination axis, and ϵ being the maximum flexure of the declination axis, positive when the end extending away from the tube bends downward. Here ϕ = the instrumental latitude.

c = the collimation. The angle between the optical axis of the telescope produced through the objective and the declination axis produced through the tube is $c+90°$.

ϵ = the maximum flexure of the declination axis, positive when the end joining the tube bends downward, opposite in sign to Chauvenet's definition of ϵ.

e = the maximum flexure of the telescope tube, positive when the objective end of the tube bends the more.

f = torsion of telescope tube.

The constants as determined with Clark Micrometer II are as follows:

The Instrumental Constants, Clark Micrometer II

Date	Obs.	Th. F.	η	i_1-c	ξ	$\epsilon \cos \phi$	c	$e \cos \phi$
1908		°	″	″	″	″	″	″
Oct. 20	Hl.	48. 9	+113	−62. 8	−48. 8			
Nov. 17	Hl.	44. 8				+102. 2	+123. 9	+5. 2
1909								
Feb. 6	Hl.	42. 0	+107. 8	−59. 4	−51. 5			
14	Hl.	41. 9				+96. 8	+121. 3	+3. 0
Mar. 20	Fn.	42. 7				+86. 0	+111. 6	−1. 7
20	Fn.	37. 0	+111. 8	−62. 3	−48. 4			
Apr. 2	Ep.	42. 9				+93. 3	+118. 1	+5. 2
3	Ep.	46. 8	+108. 2	−60. 8	−54. 5			
6	Fn.	63	+109. 6	−56. 6	−56. 2			
6	Ep.	63. 0	+110. 8	−57. 6	−59. 4			
12	Fn.	61. 8				+93. 8	+116. 2	+5. 7
May 5	Hl.	63	+111. 2	−61. 2	−53. 9			
7	Hl.	63. 3				+90. 6	+115. 0	+1. 8
10	Ep.	60	+107. 6	−62. 9	−56. 1			
10	Ep.	58. 8				+95. 4	+115. 3	+3. 9
11	Fn.	57. 5	+111. 2	−60. 2	−53. 6			
11	Fn.	57. 3				+91. 5	+114. 9	+3. 3

The Instrumental Constants, Clark Micrometer II—Continued

Date	Obs.	Th. F.	η	i_1-c	ξ	$\epsilon \cos \phi$	c	$e \cos \phi$
1909		°	″	″	″	″	″	″
June 11	Hl.	70.5	+109.8	−59.6	−54.0			
14	Hl.	68.7				+92.5	+113.0	+4.1
17	Fn.	72				+91.5	+111.7	+5.2
18	Fn.	74.8	+110.3	−59.4	−57.6			
18	Ep.	64				+91.5	+112.3	−0.4
19	Ep.	69	+109.6	−59.7	−58.5			
30	Ep.	79.1	+108.2	−59.8	−56.9			
30	Ep.	80				+87.1	+110.1	+5.7
July 2	Fn.	78.9	+110.3	−59.3	−56.0	+88.1	+111.0	−0.3
Sept. 2	Ep.	65.0	+112.6	−60.0	−67.0			
6	Ep.	65.0				+86.4	+108.8	+5.1
7	Hl.	67.6	+112.1	−60.4	−66.1			
10	Hl.	67.7				+84.3	+110.2	+5.0
28	Ep.	59.0	+108.1	−57.6	−71.4			
28	Ep.	55.0				+93.9	+117.3	+1.9
29	Fn.	59.5				+87.1	+112.6	+5.8
30	Fn.	62.2	+110.3	−60.9	−69.4			
Oct. 28	Ep.	40.0				+98.4	+118.6	+7.0
29	Ep.	41.0	+111.9	−60.8	−62.2			
Dec. 1	Ep.	43.0	+113.1	−60.6	−64.1	+89.4	+114.8	+6.1
1910								
Jan. 7	Ep.	28	+111.5	−59.8	−63.9			
7	Ep.	24				+91.8	+116.9	+5.9
25	Hl.	29.5	+111.2	−60.6	−57.2	+84.9	+111.3	+6.8
Mar. 21	Ep.	46.0	+109.8	−58.8		+92.1	+114.4	+0.6
23	Ep.	61.0	+114.9	−60.4	−61.0			
25	Hl.	70.7	+114.4	−62.8	−61.5	+92.4	+113.6	−0.1
June 23	Ep.	83.3	+112.7	−55.9	−69.8	+96.3	+117.3	+3.0
Aug. 19	Hl.	71.2	+113.3	−57.6	−68.2			
Sept. 7	Hl.	77	+109.8	−58.6	−68.9	+97.4	+116.0	+1.9
Oct. 10	Ep.	59.6	+114.0	−58.8	−75.3			
10–11	Ep.	65.2				+91.4	+113.7	+1.3
1911								
Jan. 30	Ep.	35.7				+91.9	+116.3	+7.7
Feb. 4	Ep.	42.8	+114.8	−59.0	−63.5			
Apr. 24	Ep.	51	+113.3	−58.7	−68.9	+88.4	+112.8	+3.9
July 14–15	Ep.	75.2				+83.9	+111.4	+4.6
17	Ep.	71.8	+112.6	−59.1	−72.2			
Sept. 18	Ep.	65	+113.6	−59.7	−73.4	+87.7	+111.2	+2.9
1912								
Feb. 9	Bn.	24.4	+114.6	−64.7	−60.2			
13	Bn.	24.3				+81.4	+113.3	+2.7
Mar. 25	Bn.	35.7				+82.1	+109.6	+1.9
26	Bn.	49.8	+112.8	−61.5	−66.3			
July 15 [1]	Bn.	77	+113.8	−59.0	−69.5	+92.6	+115.3	+1.5
Dec. 12 [1]	Bn.	26	+114.9	−64.0	−70.7	+89.2	+117.4	+3.5
1913								
Feb. 12 [2]	Bn.	22	+113.9	−63.5	−63.7	+83.0	+115.3	+6.8
June 29 [2]	Bn.	73	+114.9	−60.8	−70.5	+89.9	+114.4	−1.2
Nov. 24	Bn.	46	+117.4	−59.9	−74.8	+92.6	+115.5	+3.8
1914								
Feb. 16	Bn.	20	+116.4	−60.6	−72.4	+74.1	+108.1	+2.2
Mar. 24	Bn.	41	+115.5	−60.1	−72.6	+89.6	+113.4	+2.4

[1] Object glass removed between July 15 and Dec. 12.

[2] Object glass removed between Feb. 12 and June 29.

Date	Th. F.	f	Obs.	Date	Th. F.	f	Obs.
1909	°	°		1910	°	°	
June 12		+0.010	Ep.	July 8	78.6	+0.008	Hl.
14	82	0.009	Fn.	8	85.4	0.016	Bn.
20	83	0.016	Ep.	12	83.6	0.016	Hl.
20	83	0.012	Fn.	13	83.8	0.015	Bn.
23	75	0.017	Ep.	18	75.2	0.014	Hl.
23	75	0.014	Fn.	18	77.8	0.015	Bn.
Sept. 15	72.4	0.009	Fn.	Aug. 3	80.1	0.015	Ep.
15	73.0	0.015	Ep.	7	74.2	0.012	Ep.
1910				7	74.4	0.015	Bn.
July 7	75.6	0.015	Hl.	8	74.0	0.012	Ep.
7	80.8	+0.015	Bn.	8	74.4	+0.016	Bn.

For application to observations during the period October 20, 1908–March 24, 1914, tables were formed with the following assumed values of the constants:

$$\xi = -0^\circ.0152 \text{ to August 21, 1909}$$
$$\xi = -0^\circ.0180 \text{ from August 21, 1909}$$
$$\eta = +0^\circ.0308$$
$$c = +0^\circ.0318$$
$$i_1 = +0^\circ.0152$$
$$e \cos \phi = +0^\circ.0010 \ (\phi = \text{instrumental latitude})$$
$$f = +0^\circ.014$$

On August 20.9, 1909, the lower side door on the east side of the iron pier was left open, and was hit by the elevating floor. This may be the reason for the change in the value of ξ.

Instrumental constants, Repsold micrometer.—Observing was begun with the Repsold micrometer in July, 1914.

Attempts to determine the constants by the methods of Appendix III, Volume IV, were made December 15 and 16 of the year 1914 with the following results:

Date	Th. F.	η	$i_1 - c$	ξ	$\epsilon \cos \phi$	c	$e \cos \phi$
1914	°	″	″	″	″	″	′
Dec. 15	18.4				+99.7	+125.5	+8.8
16	22.8	+114.5	−59.6	−84.7			

During these observations the micrometer box seemed to slip a trifle when the micrometer was reversed. On this account, and on account of endwise play in the declination axis when the telescope is placed under the pier, the processes of Appendix III were discontinued, and methods described in the Spherical and Practical Astronomy of Chauvenet were used. However, the notation of Appendix III was retained, as written for the Clark Micrometer II.

The box screw of the Repsold micrometer was turned all the way up during the observation of constants, and the micrometer was set in two positions 180° apart. Observations were taken on both sides of the pier.

ϵ, the flexure of the declination axis, was found from observations of meridian transits above and below the pole of ephemeris stars of considerable polar distance, the hour circle being read at each observation of transits, and transits being observed on both sides of the pier.

By combining observations of the same star taken at upper and lower culmination there results

$$\epsilon \cos \phi = \frac{1}{4} [(\tau_U{}^E - \tau_U{}^W) + (\tau_L{}^E - \tau_L{}^W) - (t_U{}^E - t_U{}^W) - (t_L{}^E - t_L{}^W)]$$

where τ = the true hour angle of the star and t = the instrumental hour angle, at upper and lower culmination (indicated by subscripts), and for the telescope east of pier and west of pier (indicated by superscripts).

ξ and e were determined by setting on stars on the meridian and reading the declination circle. In the summer of 1909 the illumination of the declination circle had been improved, so that it could be used for this purpose.

For the torsion f of the telescope tube the following results were found by HALL and BURTON, to which weights were arbitrarily assigned:

	f	Wt.
	°	
1. Telescope parallel to equator	+0. 0276	2
2. Telescope in meridian	+0. 0255	1
3. Telescope in meridian	+0. 0241	2
4. Telescope in meridian	+0. 0240	1
5. Telescope in meridian	+0. 0261	1
6. From parallels	+0. 0280	2
Mean	+0. 0260	

NOTE.—The telescope was horizontal except in (6).

An additional determination of the torsion, f, was made December 24, 1926, by BURTON, the telescope being in the meridian and horizontal as in (2) to (5). The result was $f = +0°.020$; thermometer 35° F.

For the determinations of f, (2) to (5), the following method, proposed by BURTON, was employed.

Let two spirit levels be secured to the micrometer box, one the long way of the box and the other parallel to the telescope tube. Then, when each level bubble is in the center of the scale

$$f = \left\{ \frac{1}{4} [p^E{}_n - p^E{}_s + p^W{}_s - p^W{}_n] - 90° \right\} \sin \phi - i_1$$

where the values of p are readings of the position circle when the telescope is east of the pier and object glass north, east of the pier and object glass south, west of pier and object glass south, and west of pier and object glass north, respectively; ϕ = the instrumental latitude and i_1 = the inclination of the axes.

The telescope having been placed very nearly in the instrumental meridian and as nearly horizontal as possible, the hour circle may be read and the index correction applied to the readings; the values of p may then be corrected for the amount the telescope is out of the instrumental meridian. The variation of p is 15″ cos ϕ per second of hour angle in time, or 0°.003243 for the 26-inch equatorial. The position circle is read to 0°.0001 by means of the two microscopes, and settings are made on two consecutive circle divisions with each microscope to correct for run. Knowing the value of a division of the level mounted parallel to the micrometer box the position circle readings may also be corrected for the deviation of the level bubble from the center of the scale.

There is also a torsion f^1 which may be supposed to be caused by a weight attached 90° in position angle from the declination axis. The value of f^1 is practically negligible but may be obtained by taking parallels, or by a method which also gives f, found in Appendix III, Volume IV, Publications of the Naval Observatory, Second Series.

For the value (6) in the preceding table the parallels were taken in different parts of the sky, and the other constants, neglecting f^1, were applied before determining f.

For (1)–(5) a level was clamped to the micrometer box. With the tangent screw of the position circle the bubble was brought nearly to the centre of the vial, and the level and the position circle were read. The telescope was horizontal.

For (1) the telescope was placed in the plane of the equator of the instrument above and below the pier, object glass east and object glass west. No application of the other instrumental constants is necessary except i_1.

For (2) to (5), inclusive, no application of the other constants is necessary except i_1 and ξ, the latter being needed to get the instrumental latitude ϕ. Since $i_1 = i - \epsilon \sin \phi$, the constant i_1 also depends upon ϕ. The value of ϕ may be obtained independently of ξ by the method given in Appendix III, Volume IV.

As determined with the Repsold micrometer the instrumental constants, other than f, were

The Instrumental Constants, Repsold Micrometer

Date	Obs.	Th. F.	η	$i_1 - c$	ξ	$\epsilon \cos \phi$	c	$e \cos \phi$	Δt	Δp
1915		°	″	″	″	″	″	″	s	′ ″
Oct. 21	Bn.	65. 3			−94. 4			+ 1. 1		+2 22
Nov. 30	Bn.	32. 8	+121. 8	−59. 0						
Dec. 7	Bn.	34. 1	+114. 2	−57. 6			+121. 0		− 1. 5	
1916										
Jan. 24	Bn.	41. 3			−91. 2			+ 2. 2		+2 20
31	Bn.	62. 2	+114. 9	−57. 4						
Feb. 3	Bn.	26. 7	+118. 8	−59. 5		+ 97. 5	+124. 0		− 1. 6	
7	Bn.	35. 6	+110. 9	−56. 8			+121. 0		− 1. 4	
May 10	Bn.	67. 2	+120. 8	−59. 8			+121. 0		− 1. 6	
17	Bn.	58. 7	+119. 3	−55. 0		+109. 5	+121. 0		− 1. 8	
June 2	Bn.	71. 4	+111. 0	−57. 6			+122. 5		− 1. 7	
5	Hl.	67. 8			−90			+10. 9		+0 14
23	Bn.	74. 3	+119. 1	−61. 1			+115. 0		− 2. 0	
July 6	Bn.	74. 5	+117. 0	−58. 2		+ 93. 0	+121. 0		− 1. 2	
1917										
June 4	Bn.	62			−88. 6			+ 3. 7		+0 17
Sept. 20	Hl.	66. 8			−94. 2			− 1. 0		+0 18
Oct. 13	Bn.	45. 7	+113. 3	−56. 7		+ 99. 0	+122. 3		− 1. 7	
1919										
Apr. 18	Bn.	43. 1	+122. 6	−59. 9	−83. 0	+ 98. 1	+116. 1	+ 4. 9	+12. 9	+0 15
1920										
July 22	B.	75			−91. 8			+ 4. 7		+0 11. 8
28	B.	68	+110. 3	−58. 2		+102. 0	+120. 6		+12. 7	
1922										
Aug. 5	B.	71	+116. 2	−54. 8	−89. 2	+ 97. 5	+118. 2	+ 3. 1	− 1. 1	+0 44. 2
1926										
Sept.–Oct.	Bn.	71–41	+111. 9	−48. 3	−94. 5	+ 86. 4	+105. 4	− 0. 3	− 1. 4	+0 49

Verniers of declination circle adjusted occasionally.

Δt is the index correction of the hour circle. Δp is the index correction of the declination circle, which reads north polar distances on the east side of the pier and south polar distances on the west side.

For application to observations tables were formed, the values of the constants being taken to be

$$\begin{aligned} \xi &= -0^\circ.0255 \\ \eta &= +0^\circ.0324 \\ c &= +0^\circ.0336 \\ i_1 &= +0^\circ.0174 \\ e \cos \phi &= +0^\circ.0010 \\ f &= +0^\circ.0260 \end{aligned}$$

Parallels.—For a considerable period parallels were determined by trailing stars, as had been the previous practice.

Usually the stars were near the equator and near the meridian, and the telescope was east of the pier—that is, the parallels were taken near the position of the standard parallel as defined in Appendix III of Volume IV.

As is seen from the tabulation of instrumental constants, these constants change but little, so that they can be taken to hold for a long time.

The observed parallels were reduced by the formula of Appendix III to the standard parallel, telescope east, on the meridian and on the equator by the formula

$$p^e{}_m = p_1 + \Delta p_1 + \lambda$$

in which p is the observed parallel, Δp_1 is the correction for differential refraction, and λ is the correction for instrumental constants.

By this method it was necessary to set a thread on a star with the declination slow motion. In the summer of 1909 the gears actuated by the slow motion were changed by Mr. Fecker, Superintendent of the Warner and Swasey Instrument Shop, so that the accuracy of a pointing was considerably improved.

As the Clark Micrometer II does not have a double slide eyepiece, the parallels were generally taken on the long wires, usually on the middle wire. A few parallels were observed by trailing on the short wires, to determine whether they were perpendicular to the long wires.

The difference from perpendicularity was less than the errors of observation, and no correction for this difference has been applied in the few cases when the short wires were used for position angles or for differences of right ascension and declination.

After reduction to standard parallels, the results were tabulated and taken in groups, these groups usually covering considerable intervals of time, since it was evident that the parallels changed but little.

Beginning with 1914 parallels were usually taken near the position of the telescope where an observation was made. The parallel thus determined was reduced to the standard, and then the mean of a group was changed back by means of the instrumental constants to apply to the observation. In this way an error in the constants would have only a differential effect.

After the Repsold micrometer was attached to the 26-inch equatorial the middle short fixed wire was used for a time for measuring position angles when the distances were small. This micrometer is provided with a double slide eyepiece,

and the box screw has a smooth, fine motion, making it easy to test the position angle settings. For parallel determinations the stars were trailed along the short wire used in measuring angles.

Beginning with November, 1918, at the suggestion of Burton, use was made in parallel determinations of the accurately divided position circle of the Repsold micrometer. For a long wire an approximate setting was made with the declination slow motion, when the star entered the field; then an accurate setting was made on the star by means of the tangent motion of the position circle, and the circle microscopes were read. When the star was leaving the field, another setting on the star was made with the tangent motion of the position circle, and the microscopes were read a second time. Before the observation the circle was set approximately at the parallel.

For a short wire, the circle was set approximately at the parallel and the microscopes were read. When it entered the field the star was bisected with the wire by means of the box screw. On leaving the field the star was set on the wire by means of the tangent motion of the position circle, and the microscopes were read a second time.

For a complete parallel determination the star was usually made to cross the field five times, both for a long wire and a short wire.

Experiments were made by Bower with a method of determining parallels used by Dr. H. Struve, and described in Königsberg Observations, Band 41, s. 4; also described in Publications of the United States Naval Observatory, Second Series, Volume IV—Appendix III, pages F 20, F 21.

It was found desirable to modify slightly the process used by Struve, as follows: The micrometer was set at approximately the correct parallel, and the position circle was read. With the driving clock stopped the star was allowed to transit across the field. Readings on the star were taken with the middle movable micrometer wire when the star entered the field and when it left the field. The difference of the micrometer readings and the time of transit across the field gave data for correcting the approximate setting of the position circle. Usually the star was allowed to transit across the field five times.

Beginning with July, 1919, Bower determined the parallel of the middle movable wire by this method. Almost all of Bower's observations of comets and asteroids were measures of rectangular coordinates with movable and fixed short wires. The respective inclinations of these threads were determined by coincidences, in order to have the mean of the parallels of wires used for observation.

Beginning with February, 1923, Hall used the middle short movable thread for settings in position angle when the distances were small, the parallel on this wire being determined by the method just described.

April 1, 1925, Burton was reassigned to the equatorial division, after which date his measures of position angle were made with the middle movable short wire.

For a number of Burton's parallel determinations with this short wire the position circle was set approximately on the parallel, and the circle microscopes were read. This movable wire was pointed on the star when it entered the field. As the star was leaving the field the movable wire was placed on the star a second

time by means of the slow-motion screw of the position circle, after which the circle microscopes were read a second time.

The mean of the two circle readings furnished the true parallel. Four transits of the star were taken for the determination of a parallel, when a prism eyepiece was used.

During the following periods some use was made of eyepieces provided with reversing prisms for the determination of parallels:

February, 1911; October, November, December, 1912; January, February, March, April, May, June, 1913; December, 1913; January, February, March, 1914.

Beginning with June, 1925, all parallel determinations by Burton were taken with prism eyepieces except two determinations on a short wire of Clark Micrometer II when AF 54 (power 183) was used.

Probably all parallel determinations should be made with prism eyepieces, and all observations when the objects are sufficiently bright so that the loss of light on account of the prism does no harm.

No systematic corrections have been applied to parallel determinations or to any other observations.

In the spring of 1911 six new eyepieces were purchased from Steinheil, of Munich. Three were achromatic, of the type called A. F. by Steinheil, having equivalent focal lengths of 54 mm., 27 mm., and 20 mm., respectively, corresponding to magnifying powers of 183, 367, and 495. Three of the eyepieces were orthoscopic, called A. L. by Steinheil, having equivalent focal lengths of 27 mm., 20 mm., 9 mm., corresponding to magnifying powers of 367, 495, 1,100. The orthoscopic eyepieces were provided with totally reflecting prisms for use in eliminating systematic errors of observation and could be used either with or without the prisms.

Personal equation in distance measures.—A number of measures of differences in declination between faint stars in the cluster *h Persei* were made with the Repsold micrometer for determination of personal equation in distance measures. A difference, $\Delta\delta$, was measured in one step and also in several steps, with the driving clock running; $\Delta\delta$ being measured in preference to the distance s in order to eliminate errors of the driving clock. The following results of the measures do not appear to justify a personal equation correction and have not been used:

Date, W. M. T.	Obs.	Δδ(one step)	Number of Measures	Δδ(sum)	Number of Steps	Number of Measures in each Step	Illumination	Power	Seeing
1915		r		r					
Oct. 12. 4	Bn.	3. 407	4	3. 420	3	4	Red wires	388	Good.
1918									
Aug. 20. 5	Bn.	4. 344	8	4. 343	4	8	Brt. field	367	Poor.
23. 4	Bn.	3. 991	8	3. 981	4	8	Brt. field	367	Fair.
24. 4	Bn.	4. 346	8	4. 344	5	8	Brt. field	367	Fair.
Sept. 4. 6	Hl.	4. 341	4	4. 343	5	4	Brt. field	367	Fair.
9. 4	Hl.	4. 345	8	4. 340	5	4	Brt. field	367	Poor–fair.
12. 4	Hl.	4. 351	8	4. 347	5	4	Brt. field	367	Poor. Haze and clouds.
14. 4	Hl.	4. 345	12	4. 346	5	8	Brt. field	367	Fair.
Oct. 8. 4	Hl.	4. 345	8	4. 336	5	4	Red wires	367	Good.
8. 4	Hl.	4. 351	8	4. 346	5	4	Red wires	367	Good.
10. 4	Hl.	4. 346	8	4. 333	5	4	Red wires	367	Fair.
14. 4	Bn.	4. 346	8	4. 352	5	4	Red wires	367	Fair.
14. 4	Hl.	4. 340	8	4. 340	5	4	Red wires	367	Fair–poor.
15. 3	Hl.	4. 347	8	4. 346	5	4	Red wires	367	Fair.
15. 3	Hl.	4. 344	8	4. 357	5	4	Red wires	367	Fair–poor. Clouds.
16. 4	Bn.	4. 340	8	4. 347	5	4	Red wires	367	Poor.
16. 4	Bn.	4. 347	8	4. 351	5	4	Red wires	367	Fair.
18. 4	Hl.	4. 345	8	4. 350	5	4	Red wires	367	Fair–poor.
Nov. 7. 4	Hl.	4. 342	8	4. 352	5	4	Red wires	495	Fair.

II. THE 12-INCH EQUATORIAL

A description of the 12-inch equatorial and accessories may be found in Publications of the United States Naval Observatory, Second Series, Volume VI, and part of the following data is taken therefrom.

The 12-inch objective (clear aperture 11.98 inches or 304.3 mm.) made by Alvan Clark & Sons has been in use since December 19, 1895. The focal length is approximately 15 feet. The distance between the crown and flint lenses, measured along the line joining their centers, is $0^{in}.0391 \pm$ as deduced by Prof. William Harkness.

The pier is situated 172 feet south and 276 feet east of the center of the clock room, the point which indicates the position of the observatory. The top of the pier is 46½ feet from the ground, and 2 feet below the floor under the instrument.

The mounting was constructed by Saegmüller.

The column is of cast iron and rises to a height of 8 feet above the floor. The casting which carries the polar axis is provided with means for adjustment in altitude and azimuth. The polar and declination axes are of steel. The polar axis is 3 feet long and 3 inches in diameter; the declination axis 3½ feet long and 2½ inches in diameter.

The tube is composed of seven sections of rolled sheet steel, in addition to a cast steel central section attached to the declination axis. It tapers from a diameter of 15 inches in the center to a diameter of 12 inches at the end. It contains diaphragms with apertures large enough to avoid cutting off the outer edge of the

field of view of the low-power Huygenian eyepieces. Its length, excluding the draw tube, is 169 inches.

The hour and declination circles are graduated on silver to 30^s and $5'$ respectively, and may be read to 1^s in hour angle and $10''$ in declination by means of verniers. The diameter of the hour circle is 14⁹⁄₁₆ inches and the diameter of the declination circle is 17⁷⁄₁₆ inches.

The finder has an aperture of 4¹⁄₁₆ inches and a focal length of 46½ inches. The finder eyepiece has a magnifying power of 35 diameters and a field of view of 1½°. In 1926 the finder was moved about 7½ inches toward the objective end of the 12-inch, leaving about 5 inches between the finder and the focal plane of the 12-inch. It was also made easier of adjustment in α and δ by relocating the finder posts and adding an extra screw to hold the finder more firmly in place. These changes were made by Mr. A. G. Ilse.

Attached to the south side of the column is a pair of dials, designed by Prof. William Harkness for approximate settings in right ascension and declination.

The driving clock has a double conical pendulum governor and is driven by a weight which is wound by hand. The driving clock has apparently never been satisfactory and a number of attempts have been made to improve it. The conical pendulum seems to be too small to govern the speed. Also the space within the column is only about 13¾ inches in diameter and is too small for a much larger pendulum.

In July, 1916, a small transformer was placed in the 110-volt commercial lighting circuit and the voltage was reduced thereby, so that 3 to 4 volt lamps, each giving about 2 candlepower, could be used on the instrument. New brushes were made by Mr. Ilse to carry the current which lights the circles.

The micrometer was made by Saegmüller. On the fixed plate are five spider threads, called transit threads, or long threads, about $9^s.1$ apart as determined by an equatorial star. At right angles to these and on the same plate is a short thread. The slide which is moved by the micrometer screw carries three short threads which are parallel to the fixed short thread.

The periodic and progressive errors of the screw are small and no corrections for them have been applied. The value of a revolution has been taken as $22''.8944$, from determinations by Professor See and Mr. Hammond.

It has been customary to use the micrometer in the position head up to prevent the pull of the spring against which the screw works from being counteracted by gravity, but in the determination of constants by the methods of Appendix III, Volume IV the micrometer was used both head up and head down.

During 1921–22 the 12-inch was equipped with an amplifier (Barlow lens), and an additional low power negative eyepiece (designated by A in Table II); also with adapters to render most of the negative eyepieces available for use with the amplifier. This apparatus practically doubles the focal length of the objective, thus increasing the magnifying powers of the large-field eyepieces. A large 90° prism in a suitable mounting was secured at the same time for viewing objects near the zenith. These optical attachments, planned by Mr. Peters especially for visitors, were constructed by Mr. M. E. Kahler and have proved to be convenient and satisfactory.

Following are data in regard to the eyepieces:

TABLE I.—*Positive Eyepieces, 12-inch Equatorial*

Eyepiece	Power	Field	Maker	Type
		′		
I	115	21.0	M. E. Kahler	Kellner.
II	160	16.0	M. E. Kahler	Kellner.
III	235	12.4	M. E. Kahler	Kellner.
IV	335	8.0	M. E. Kahler	Kellner.
V	500	6.1	M. E. Kahler	Kellner.
VI	705	4.7	M. E. Kahler	Kellner.

The magnifying powers in Table I are the means of determinations by Professor SEE and Mr. HAMMOND, with the Ramsden dynameter.

TABLE II.—*Negative Eyepieces, 12-inch Equatorial*

Eyepiece	Power	Field	Maker	Type
		′		
I	37	66	M. E. Kahler	Airy-Huygenian.
II	50	50	M. E. Kahler	Airy-Huygenian.
III	85	33	M. E. Kahler	Airy-Huygenian.
IV	118	26.5	M. E. Kahler	Airy-Huygenian.
V	196	15.6	M. E. Kahler	Airy-Huygenian.
VI	258	9.2	M. E. Kahler	Airy-Huygenian.
VII	314	6.8	M. E. Kahler	Airy-Huygenian.
VIII	571	4.5	M. E. Kahler	Airy-Huygenian.
IX	790	3.0	M. E. Kahler	Airy-Huygenian.
A	162 324[1]	33.0 16.2	M. E. Kahler	Airy-Huygenian.

[1] With amplifier.

The magnifying powers in Table II were determined with the Ramsden dynameter, the first 9 by Professor SEE and the last 2 by Mr. BOWER.

There are also two solar eyepieces—one Herschel prismatic, and one polarizing (JOHN A. BRASHEAR, No. 16).

The chronograph with the Hipp spring governor having produced a number of unsatisfactory records, it was decided to use a conical pendulum instead of the spring. The necessary changes in the chronograph were made by Mr. RHEINBOLD, and the chronograph records were somewhat improved. However, on account of further trouble this chronograph was replaced in 1926 by a Bausch and Lomb chronograph made after the Saegmüller pattern.

In 1926 Mr. ILSE attached a pair of weight-carrying rods to the telescope tube near the eye end in order that weights for balancing the instrument could be added upon removing the micrometer. Formerly the instrument was balanced, with respect to the declination axis only, by adjusting weights at the objective end. The weights may now be quickly and easily adjusted, and the operation of putting on and taking off the micrometer has been simplified.

A double slide rheostat has been fastened to the tube at the eye end for regulating the two micrometer lamps; also a third contact ring was added to the

micrometer. One rheostat controls the lamp which illuminates the long threads; the other controls the lamp which illuminates the short threads, so that each set of threads may be illuminated independently of the other, or the two sets may be equalized in brightness. The same effect was before obtained roughly with one rheostat and two adjustable shutters, one for each lamp. The color of the threads when illuminated is red. Asteroids as faint as the eleventh magnitude may be observed. The estimated magnitude of Wratislavia observed in January, 1911, was 11.2.

Efforts to determine the constants of the 12-inch give results so discordant as to indicate some instability about the instrument; perhaps an insecurity in the clamps. Although no corrections on account of constants have been applied to the observations, the present practice of orienting the micrometer according to the parallel near the place of an observation practically eliminates the effect of the constants.

Following are the results of determinations of constants, the notation being the same as defined for the 26-inch (see p. 45):

The Instrumental Constants, 12-inch Equatorial

Date	Observer	Th. F.	ξ	η	$e \cos \phi$	$\epsilon \cos \phi$	$i_1 - c$	c
1903		°	″	″	″	″	″	″
Jan. 19	King	21	+54	+25			−72	
Dec. 6	Hammond	30	+63	+29	+12	+136	−83	+102
1904								
Jan. 27	Hammond	21	+82	+28	+8	+138	−87	+107
Apr. 4	Hammond	40	+68	+27			−83	
1909								
Feb. 8	Eppes			+22			−69	
Aug. 27	Frederickson	79		+60			−64	
Sept. 1	Frederickson		+72					
7, 10	Frederickson	65, 74			+5	+139		+90
18	Frederickson	70	+80	+47			−60	
1910								
Oct. 31	Eppes			+47			−54	
1926								
Apr. 22 [1]	Burton	80	+88					
1927								
Mar. 4	Burton	36		+64				

[1] Additional balancing weights placed on instrument in 1926 prior to Apr. 22.

The last value of ξ was determined by Professor Schaeberle's method as described in the Astronomische Nachrichten No. 2374, and Campbell's Elements of Practical Astronomy, pages 215–217. The necessary apparatus was constructed by Mr. Ilse.

III. OBSERVATIONS AND REDUCTIONS

The observations are arranged in sections as follows:

A. Observations of Satellites.
B. Observations of Diameters of Planets and Widths of Saturn's Rings.
C. Observations of Asteroids.
D. Observations of Comets.
E. Observations of Occultations.
F. Observations of Solar Eclipses and Transit of Mercury.
G. Observations of Eclipses of Satellites of Jupiter and Saturn.
H. Observations of Double Stars.
I. Observations of Miscellaneous Stars, Novæ, and Nebulæ.
J. Miscellaneous Observations.

The observations of each object are, for the most part, arranged in chronological order.

Corrections for differential refraction, and for the effect of instrumental constants, except for the 12-inch equatorial, were applied to the observations, and special corrections were applied when necessary.

Methods of correcting equatorial observations for differential refraction and instrumental constants may be found in Publications of the United States Naval Observatory, Second Series, Volume IV, Appendix III (Washington, 1905).

Discussions of satellite observations have been published in the Astronomical Journal as follows:

Object	Author	A. J.	Period of Observations	Observer
Satellites of Mars	Hall	No. 645	1909 Aug. 23–Oct. 16	Hl.
Satellites of Uranus	Hall	627	1908 June 4–Aug. 2 1909 Apr. 23–July 20 1910 July 5–Aug. 9	Hl.
Satellites of Uranus	Eppes	648	1911 June 1–Sept. 13	Ep. Bn.
Satellite of Neptune	Hall	654	1911 Jan. 28–Mar. 31 1911 Jan. 30–Mar. 30	Hl. Bn.
Satellite of Neptune	Burton	654	1911 Dec. 18—1912, Apr. 11	Bn.
Satellites of Mars	Hall Lamson Bower	873	1924 July 19–Sept. 24	Hl. B.

A. OBSERVATIONS OF SATELLITES

The observations are grouped in order of the distances of the planets from the Sun, beginning with the satellites of Mars and ending with the satellite of Neptune.

The Satellites of Mars.—The satellites of Mars have been observed as follows:

Phobos (at 6 Oppositions)

Observed	Coordinates	Number of Observations	Observer
1909 Aug. 23–Oct. 16	$\Delta\alpha$ cos δ, $\Delta\delta$	53, 56	Hl.
1911 Nov. 2–Dec. 19	Δa, Δd	24, 26 0, 1	Hl. Bn.
1913 Dec. 20–1914 Jan. 15	Δa, Δd	14, 17	Bn.
1922 May 29–May 30	$\Delta\alpha$ cos δ, $\Delta\delta$	3, 4	Hl.
1922 June 3–July 6	p, s	5, 5	Hl.
1924 July 19–Sept. 24	p, s	38, 38 26, 25	Hl. B.
1926 Oct. 4–Dec. 10	$\Delta\alpha$ cos δ, $\Delta\delta$	26, 27	Bn.
1926 Oct. 4–Dec. 2	p, s	15, 15	Hl.

Clark Micrometer II was used at the first three oppositions of Mars. The Repsold micrometer was used at the later oppositions except for an occasional observation.

Deimos (at 7 Oppositions)

Observed	Coordinates	Number of Observations	Observer
1909 Aug. 23–Oct. 9	$\Delta\alpha \cos\delta$, $\Delta\delta$	52, 52	Hl.
		4, 4	Ep.
1911 Nov. 3–Dec. 19	Δa, Δd	18, 16	Hl.
1913 Dec. 27–1914 Jan. 21	Δa, Δd	11, 9	Bn.
1916 Feb. 3	Δa, Δd	1, 1	Hl.
1922 May 22–May 29	$\Delta\alpha \cos\delta$, $\Delta\delta$	3, 3	Hl.
1922 June 3–June 29	p, s	4, 4	Hl.
1924 July 16–Sept. 23	p, s	31, 31	Hl.
		18, 17	B.
1926 Oct. 4–Dec. 2	$\Delta\alpha \cos\delta$, $\Delta\delta$	27, 27	Bn.
1926 Oct. 21–Nov. 30	p, s	23, 23	Hl.

Clark Micrometer II was used at the first three oppositions of Mars. The Repsold micrometer was used at the later oppositions except for an occasional observation.

An observation of a satellite of Mars consisted usually of four measures in each of two coordinates, taking Mars as the origin, and was made with the driving clock running.

Three systems of coordinates were used:

(1) Parallel and perpendicular to the celestial equator, that is, $\Delta\alpha \cos\delta$ and $\Delta\delta$;

(2) Parallel and perpendicular to the equator of Mars, indicated by Δa and Δd;

(3) Position angle and distance, or p and s.

In 1909 the measures were taken in the rectangular coordinates $\Delta\alpha \cos\delta$ and $\Delta\delta$. They were made with respect to the limbs of Mars, and were symmetrically arranged so that the means of the times of the measures with respect to two opposite limbs were nearly equal.

In addition to corrections for differential refraction and instrumental constants the following corrections were applied to the measures:

(1) For the phase of the planet, or defective illumination, to obtain coordinates referred to the planet's center;

(2) For the motion of the satellite, to reduce the mean of four measures to the mean of the corresponding times.

The data for phase corrections were taken from the British Nautical Almanac. The phase corrections p_α, p_δ in $\Delta\alpha \cos\delta$ and $\Delta\delta$ are given by the formulæ

$$p_\alpha=\frac{1}{4}\left(1-\sqrt{1-\sin^2 d \sin^2 Q}\right)\Delta=p_1\cdot\Delta$$

$$p_\delta=\frac{1}{4}\left(1-\sqrt{1-\sin^2 d \cos^2 Q}\right)\Delta=p_2\cdot\Delta$$

where

Δ = the planet's apparent diameter (Mars considered spherical);
d = the angle between the Earth and Sun as seen from the planet;
Q = the position angle of the point of greatest defect.

A table was computed for the coefficient $\frac{1}{4}\left(1-\sqrt{1-\sin^2 d \sin^2 Q}\right)$ in which the arguments were d and Q for p_1, d and $Q\pm 90°$ for p_2.

The sign of the correction in right ascension was taken positive when the planet transited after apparent midnight and negative if it transited before apparent midnight; the sign of the correction in declination was taken positive for values of Q between 90° and 270°, and negative for values greater than 270° and less than 90°.

The corrections for motion m_α, m_δ were obtained from the formulæ

$$m_\alpha = \left(\sec\frac{\theta}{2} - 1\right)\Delta\alpha \cos\delta = F_\alpha \cdot \Delta\alpha \cos\delta$$
$$m_\delta = \left(\sec\frac{\theta}{2} - 1\right)\Delta\delta \qquad = F_\delta \cdot \Delta\delta$$

where, neglecting the eccentricity of the satellite's orbit, $\theta°$ = the true angular distance described by the satellite in its orbit in the interval of time, t minutes, between the first and fourth measures, or between the second and third measures.

For Phobos, $\theta = 0°.784\ t$; for Deimos, $\theta = 0°.198\ t$. Tables were constructed for the factor $\left(\sec\frac{\theta}{2} - 1\right)$, the argument being t in minutes and tenth minutes.

M, m, W, w being differential-refraction coefficients from Appendix III, Volume IV, and λ°_α, λ°_δ small deviations from the correct orientation of the micrometer due to instrumental constants, the final values of the coordinates were

$$(\Delta\alpha \cos\delta)_0 = \Delta\alpha \cos\delta + M \cdot \Delta\alpha \cos\delta + F_\alpha \cdot \Delta\alpha \cos\delta + m \cdot \Delta\delta + \sin\lambda_\alpha \cdot \Delta\delta + p_\alpha$$
$$\Delta\delta_0 = \Delta\delta + W \cdot \Delta\delta + F_\delta \cdot \Delta\delta + w \cdot \Delta\alpha \cos\delta - \sin\lambda_\delta \cdot \Delta\alpha \cos\delta + p_\delta$$

Eyepiece 3C (360 diameters) was used throughout for the observations of 1909. One-half the eyepiece lens nearest the focal plane was covered with a semicircular piece of red glass behind which Mars was placed while the measures were being made. This arrangement had the effect of throwing Mars and the wire seen through the red glass slightly out of focus, but the focus was kept on the satellite. It would have been necessary to pull the eyepiece out a little to bring the planet into focus.

Red light was used for wire illumination. It was generally unnecessary to illuminate the wires, as they could be seen without illumination in the vicinity of Mars.

Periodic errors of the driving clock were troublesome and made the measures in $\Delta\alpha \cos\delta$ somewhat difficult; therefore these should be given, perhaps, less weight as compared with the measures of $\Delta\delta$.

The measures in 1911 were made in the coordinates Δa and Δd, the position circle being set 0° and 90° from the position angle given by the British Nautical Almanac for the north end of the axis of rotation of Mars. A pair of fixed wires about 14″ apart was used on Mars and a single movable wire on the satellite. The fixed wires were placed so as to make equal distances, not equal areas of light, between the fixed wires and the limbs. Four measures in a coordinate were usually made before turning the position circle for the other coordinate. The coincidence of the movable wire with the mean of the two fixed wires was obtained, and the difference between coincidence and the mean of four measures was regarded as a complete observation in one coordinate.

In 1911 two eyepieces were used—3C with red glass and 3B (388 diameters). In front of the field lens of 3B was mounted a circular piece of microscope cover glass, the surface of which was smoked and then cleaned, so as to leave a smoked

semicircular portion behind which Mars was placed during the measures. The smoked glass was suggested by Assistant E. D. TILLYER.

The final values of the coordinates were

$$\Delta a_o = \Delta a + (A + F_a)\Delta a + (a + \sin \epsilon_a)\Delta d + p_a$$
$$\Delta d_o = \Delta d + (d - \sin \epsilon_d)\Delta a + (D + F_d)\Delta d + p_d$$

where

$$A = \frac{M+W}{2} + \frac{M-W}{2}\cos 2P - \frac{m+w}{2}\sin 2P$$
$$a = \frac{M-W}{2}\sin 2P + \frac{m+w}{2}\cos 2P + \frac{m-w}{2}$$
$$D = \frac{M+W}{2} - \frac{M-W}{2}\cos 2\ P + \frac{m+w}{2}\sin 2\ P$$
$$d = \frac{M-W}{2}\sin 2\ P + \frac{m+w}{2}\cos 2\ P - \frac{m-w}{2}.$$

M, m, W, w were taken from the tables of differential refraction; P, the position angle of the north end of the rotation axis of Mars, was taken from the British Nautical Almanac.

F_a, F_d = factors depending upon the motion of the satellite, $= \sec \frac{\theta}{2} - 1$, taking θ as defined for the reductions of 1909.

ϵ_a, ϵ_d = errors in setting the position circle for the measures in Δa and Δd, respectively $= S + \lambda_\tau - p^e{}_m - P \pm 90°$ and $S + \lambda_\tau - p^e{}_m - P$ in which

S = the reading of the position circle when the measures were made;

λ_τ = the instrumental correction depending upon the hour angle τ and the declination of Mars;

P = the position angle of the planet's rotation axis, as previously defined.

$p^e{}_m$ = the standard parallel = the setting of the position circle determined by the trail of an equatorial star along the micrometer wire when the telescope was east of the pier and near the meridian.

When rectangular coordinates are measured the value of $p^e{}_m$ should be the mean of determinations made on both the fixed and movable short wires used in measuring. It has been found preferable to determine the parallel for the movable wire and derive the inclination of a fixed wire to the movable by taking coincidences; whence $p^e{}_m$ for the mean is easily determined.

With Clark Micrometer II it was difficult to make a good determination of the parallel on the short wires, not only on account of the shortness of the wires but also on account of the lack of a transverse slide for the eyepiece. The parallel was usually taken on the central long wire and assumed to be practically equal to 90° from the required parallel.

p_a, p_d are corrections for the phase of Mars

$$p_a = \tfrac{1}{4}[1 - \sqrt{1 - \sin^2 d \sin^2 (Q-P)}\,]\,\Delta = p_1 \cdot \Delta$$
$$p_d = \tfrac{1}{4}[1 - \sqrt{1 - \sin^2 d \cos^2 (Q-P)}\,]\,\Delta = p_2 \cdot \Delta$$

where d, Q, P, Δ are as previously defined for phase corrections.

p_1, tabulated for arguments d and $Q-P$, was taken positive for values of $Q-P$ between 180° and 360°; p_2, taken from the same table with arguments d and $Q-P \pm 90°$, was taken positive for values of $Q-P \pm 90°$ between 90° and 270°.

At the opposition of 1914 the satellites were again measured in Δa and Δd. Single wires were used and the four measures in each coordinate were, with one exception (Dec. 20, 1st observation), arranged symmetrically, as in 1909. Eyepiece 3C with red glass was used throughout and focused on the wire which was used on the satellite. Black wires were used for Phobos, red or black for Deimos.

In 1922 a few observations were obtained in $\Delta\alpha \cos\delta$ and $\Delta\delta$, the measures being made with respect to the limbs and arranged symmetrically as to the times, that is, in the order a, b, b, a, where a and b were opposite limbs. Also a few observations were made in position angle and distance, p and s.

When the measures were in p and s the illuminated portion of the disk was bisected, for both coordinates, by division into equal areas of light, practically the same as measuring from the estimated center of gravity of the illuminated disk. The measures were also symmetrically arranged so that the mean of the times of measures in position angle was equal approximately to the mean of the times of the distance measures.

Position angles were measured with one of the short fixed wires in order to use the box screw instead of the slow-motion handle which moves the telescope in declination. The micrometer was turned 90° for the distance measures.

Eyepiece 3C with red glass attached was used throughout in 1922. Black wires were used for Phobos, red for Deimos.

The corrected values of $\Delta\alpha \cos\delta$ and $\Delta\delta$ were

$$(\Delta\alpha \cos\delta)_o = \Delta\alpha \cos\delta + (M + F_\alpha)\Delta\alpha \cos\delta + (m + \sin\epsilon_\alpha)\Delta\delta + p_\alpha$$

$$\Delta\delta_o = \Delta\delta + (w - \sin\epsilon_\delta)\Delta\alpha \cos\delta + (W + F_\delta)\Delta\delta + p_\delta$$

in which M, m, w, W, F_α, F_δ, p_α, p_δ have the same meaning as in the reductions of 1909; ϵ_α, ϵ_δ = errors in setting the position circle for the measures in $\Delta\alpha \cos\delta$ and $\Delta\delta$, respectively, $= S + \lambda_r - p^e{}_m \pm 90°$ and $S + \lambda_r - p^e{}_m$, where S, λ_r, $p^e{}_m$ are as defined for the reductions of 1911.

The corrected values of p and s were

$$p_o = p + \Delta p + \lambda + (90° - p^e{}_m) + F_p + \varphi_p$$

$$s_o = s + [h + (\sec\epsilon - 1) + F_s]s + \varphi_s$$

Δp, h are corrections for refraction from Volume IV, Appendix III; λ = the correction for instrumental constants; $p^e{}_m$ = the standard parallel; F_p, F_s = corrections for motion to reduce the mean of the measures to the mean of the corresponding times; ϵ = error in setting the position circle for measures in s; φ_p, φ_s = phase corrections. F_p was considered to be negligible.

$F_s = \sec\frac{\theta}{2} - 1$, taking θ as defined for the reductions of 1909.

The phase corrections φ_p, φ_s were given by the formulæ

$$s \sin\varphi_p = +\frac{4q}{3\pi}\sin(p - Q)$$

$$\varphi_s = -\frac{4q}{3\pi}\cos(p - Q)$$

p and s are the observed position angle and distance, respectively; Q is the position angle and q the amount of the greatest defect of illumination (from the American Ephemeris or the British Nautical Almanac); and π is the constant 3.1416.

The opposition of 1924 was favorable for observing the satellites, but owing to the southern declination of Mars there was considerable poor seeing.

The observations were all made in p and s and reduced mostly by the methods used for the opposition of 1922. The position angles, including the correction for

motion F_p, were reduced to the mean of the times of the distance measures. The method of the latter reduction, suggested by Mr. WILLIS, was as follows:

Let $F^s{}_p$ = the required reduction,
a = the apparent semimajor axis of the satellite's orbit,
b = the apparent semiminor axis,
M = angle in real orbit between elongation and satellite, assuming $e=0$ (e=eccentricity);
p^c = corresponding angle in the apparent orbit, computed from $\tan p^c = \frac{b}{a} \tan M$.

Let $p^o{}_1, p^o{}_2, --- p^o{}_m$ = observed angles and their mean;
$p^c{}_1, p^c{}_2, --- p^c{}_m$ = corresponding computed angles and their mean;
$p^s{}_1, p^s{}_2, ---- p^s{}_m$ = the observed angles and their mean transferred to a given epoch;
$p^c{}_s$ = corresponding computed angle at that epoch.

Then

$$
\begin{gathered}
p^o{}_1 + (p^c{}_s - p^c{}_1) = p^s{}_1 \\
p^o{}_2 + (p^c{}_s - p^c{}_2) = p^s{}_2 \\
--- \quad - \quad - \\
p^o{}_m + (p^c{}_s - p^c{}_m) = p^s{}_m
\end{gathered}
$$

Whence

$$F^s{}_p = p^c{}_s - p^c{}_m.$$

The phase corrections φ_p, φ_s were computed from the formulæ

$$\sin \varphi_p = \frac{+4q}{3\pi s_p} \sin (p-Q), \text{ or } \varphi_p = +24.32q \sin (p-Q)$$

and

$$\varphi_s = \frac{-4q}{3\pi} \cos (p-Q) = -0.4244\, q \cos (p-Q)$$

where

$$p = \text{the observed position angle}$$

and

$$s_p = \text{the observed distance transferred to the time of } p.$$

Q, q, and π are as previously defined.

s_p is given by the formula

$$s_p = s_s \frac{\cos M_p}{\cos p_p} \frac{\cos p_s}{\cos M_s} = a \frac{\cos M_p}{\cos p_p}$$

where

$$M_p, M_s = \text{angles in real orbit}$$

and

p_p, p_s = angles in apparent orbit, between elongation and satellite at the times of p and s, respectively.

$$s_s = \text{the observed distance.}$$

Eyepiece 3C with red glass attached was used throughout the opposition of 1924. Black wires were generally used on Phobos, black or red on Deimos.

The position angles were measured with the middle short movable wire M_6, the settings being made with the micrometer screw together with the slow-motion tangent screw which rotates the micrometer. This method is convenient and the parallel may be well determined on M_6.

The correction to be applied to measures in rectangular coordinates, or distance measures, for the motion of a satellite, neglecting eccentricity, has usually been obtained by means of tables intended to be used when the measures were made in pairs, as in 1909. Following is the development of a process of approximately correcting for motion when the measures were not made in pairs.

In the apparent elliptical orbit of a satellite:

Let X_o, Y_o = the satellite's rectangular coordinates taken parallel and perpendicular, respectively, to the major axis of the apparent ellipse with the center of the planet as origin.
a, b = the semimajor and semiminor axes of the apparent ellipse.

θ=the uniformly varying angle in the plane of the true circular orbit at the center of the planet between the satellite and elongation.

Then $X_o = a \cos\theta$ and $Y_o = b \sin\theta$.

Let $x_1, x_2, --- x_n$=a set of measures of any linear coordinate, and $t_1, t_2, --- t_n$=the corresponding times.

Let $x = \frac{1}{n}(x_1 + x_2 + -- + x_n)$

$t_o = \frac{1}{n}(t_1 + t_2 + -- + t_n)$

x_o=the corrected coordinate which corresponds to t_o.

γ=the angle between the major axis of the apparent ellipse and the direction in which the measures were made; this angle is assumed to be constant during the observation.

Let θ (previously defined) correspond to t_o.

θ'=rate of change of θ.

$\beta_1 = (t_1 - t_o)\theta'$, $\beta_2 = (t_2 - t_o)\theta'$, $---$ $\beta_n = (t_n - t_o)\theta'$.

$X_1 = a \cos(\theta + \beta_1)$ $\qquad Y_1 = b \sin(\theta + \beta_1)$

$X_2 = a \cos(\theta + \beta_2)$ $\qquad Y_2 = b \sin(\theta + \beta_2)$

---------- $\qquad$ ----------

$X_n = a \cos(\theta + \beta_n)$ $\qquad Y_n = b \sin(\theta + \beta_n)$.

Then $x_o = X_o \cos\gamma - Y_o \sin\gamma$

and $x_1 = X_1 \cos\gamma - Y_1 \sin\gamma$

$= a \cos(\theta + \beta_1)\cos\gamma - b \sin(\theta + \beta_1)\sin\gamma$

$= a \cos\theta \cos\beta_1 \cos\gamma - a \sin\theta \sin\beta_1 \cos\gamma - b \sin\theta \cos\beta_1 \sin\gamma - b \cos\theta \sin\beta_1 \sin\gamma$

$= x_o \cos\beta_1 - c \sin\beta_1$

where $\qquad c = a \sin\theta \cos\gamma + b \cos\theta \sin\gamma$.

Therefore $x_o = x_1 \sec\beta_1 + c \tan\beta_1$.

Similarly $x_o = x_2 \sec\beta_2 + c \tan\beta_2$.

$x_o = x_n \sec\beta_n + c \tan\beta_n$.

Whence $nx_o = x_1 \sec\beta_1 + x_2 \sec\beta_2 + -- + x_n \sec\beta_n + c(\tan\beta_1 + \tan\beta_2 + --- + \tan\beta_n)$.

If third order terms in the expansions of $\tan\beta_1$, $\tan\beta_2$, ---- $\tan\beta_n$ be neglected, the term containing c may be omitted, since $\beta_1 + \beta_2 + --- + \beta_n = 0$.

Neglecting also the small differences between $x_1, x_2, --- x_n$ and x

$$nx_o = x(\sec\beta_1 + \sec\beta_2 + --- + \sec\beta_n)$$
$$= nx + [(\sec\beta_1 - 1) + (\sec\beta_2 - 1) + -- + (\sec\beta_n - 1)]x.$$

Let $\sec\beta_1 - 1 = F_1$, $\sec\beta_2 - 1 = F_2$, $---$ $\sec\beta_n - 1 = F_n$ and $\frac{1}{n}(F_1 + F_2 + --- + F_n) = F_x$.

Then $x_o = x + F_x x$.

This process becomes rigorous when applied to a pair of measures and is practically the same as heretofore employed when the measures were made in pairs.

Satellite VI of Jupiter has been observed as follows:

Observed	Number of Observations	Observer
1909 Apr. 9–Apr. 23	6	Fn.
1910 Apr. 8–Apr. 13	3	Ep.
1911 Mar. 24–June 1	5	Ep.
1912 Apr. 23–June 8	5	Bn.
1913 June 5–July 7	5	Bn.
1914 Sept. 14–Sept. 22	3	Bn.
1915 Oct. 27–Oct. 29	4	Bn.
1918 Dec. 2–1919, Jan. 31	4	Bn.
1922 May 29	1	B.
1923 Apr. 18	1	B.
1926 Aug. 30–Sept. 11	3	Bn.

Satellite VI is usually difficult, especially for southern declinations of Jupiter, but attempts are made to secure at least three observations at an opposition. The position of the satellite was determined with reference to a star by measuring $\Delta\alpha$

and $\Delta\delta$ by transits, or $\Delta\alpha \cos \delta$ and $\Delta\delta$ with the driving clock running. Red light (ruby or darker) was used for wire illumination. Eyepieces AF 54 (183 diameters), 3 B (388 diameters), and AF 27 (367 diameters), were used. The lowest power permits the use of five transit threads without sliding the eyepiece; the other two powers will give three transit wires. No attempt was made to slide the eyepiece during transits on account of the difficulty of keeping the satellite in sight.

For comparisons by transits the comparison star was usually chosen as near in declination as possible to make the corrections for differential refraction and instrumental constants small, and to eliminate practically any error due to the transit wires not being parallel. The micrometer was set 90° from the parallel taken on the middle long wire T_3. The time of transit of the satellite over T_3 was taken as the time of the observation.

The Satellites of Saturn.—Eight satellites were observed in pairs, the coordinates usually being p and s (sometimes $\Delta\alpha$ and $\Delta\delta$ in the case of Titan-Hyperion and Titan-Japetus). When $\Delta\alpha$ and $\Delta\delta$ were measured the time of the transit of Titan was taken as the time of observation and the measures were then corrected for the motions of Saturn and the outer satellite during the interval $\Delta\alpha$.

The satellites, except Hyperion, were generally observed with bright field illumination, and a prism eyepiece was often used, as shown in the list of observations. When an eyepiece with prism was used the short wires were placed apparently vertical for distance measures, and the wire, either long or short, used for angle measures was generally placed apparently vertical. An eyepiece with occulting strip attached was sometimes employed to screen Saturn when the fainter satellites were being observed.

Satellites were observed in pairs as follows:

Pair	Observed	Number of Observations	Observer
Tethys-Mimas	1908 Aug. 29–Sept. 30	6, 6	Hd.
	1910 Sept. 12–Oct. 18	4, 4	Hl.
	1911 Sept. 6–Dec. 19	11, 10	Bn.
	1912 Sept. 20–1913 Jan. 14	19, 19	Bn.
	1914 Oct. 2–1915 Mar. 13	19, 19	Hl.
	1915 Nov. 9–1916 Feb. 3	5, 5	Hl.
Rhea-Mimas	1908 Aug. 29–Sept. 30	6, 6	Hd.
	1910 Oct. 17	1, 1	Hl.
	1911 Sept. 6–Nov. 16	9, 9	Bn.
	1912 Sept. 20–1913 Jan. 14	18, 18	Bn.
	1914 Nov. 23–1915 Mar. 13	20, 20	Hl.
	1915 Nov. 3–Dec. 6	4, 4	Hl.
Tethys-Enceladus	1908 Aug. 29–Oct. 14	13, 13	Hd.
	1909 Oct. 20–Dec. 6	6, 6	Hl.
	1910 Sept. 12–1911 Jan. 6	13, 13	Hl.
	1911 Sept. 6–Dec. 5	16, 16	Hl.
	1912 Oct. 1–1913 Jan. 4	20, 20	Bn.
	1914 Sept. 26–1915 Mar. 31	61, 61	Hl.
Dione-Tethys	1908 Aug. 29–Oct. 14	16, 16	Hd.
	1909 Sept. 2–Dec. 20	16, 17	Hl.
	1910 Sept. 7–1911 Jan. 6	13, 13	Hl.
	1911 Sept. 12–Nov. 30	20, 20	Bn.
	1912 Oct. 1–1913 Feb. 1	23, 23	Bn.
	1914 Sept. 26–1915 Apr. 7	67, 67	Hl.

Pair	Observed	Number of Observations	Observer
Rhea-Tethys	1908 Aug. 29–Oct. 5	16, 16	Hd.
	1909 Oct. 22–Dec. 20	6, 6	Hl.
	1910 Sept. 7–Dec. 25	10, 9	Hl.
	1911 Sept. 11–Dec. 1	20, 19	Bn.
	1912 Oct. 1–1913 Jan. 30	21, 21	Bn.
	1914 Sept. 28–1915 Apr. 7	66, 66	Hl.
Rhea-Dione	1908 Aug. 29–Oct. 14	16, 16	Hd.
	1909 Oct. 13–Dec. 20	14, 14	Hl.
	1910 Sept. 7–Dec. 13	12, 12	Hl.
	1911 Sept. 13–Dec. 17	19, 19	Hl.
	1914 Oct. 18–1915 Apr. 6	64, 64	Hl.
Titan-Rhea	1908 Aug. 29–Oct. 17	15, 15	Hd.
	1909 Oct. 20–Dec. 21	40, 40	Hl.
		18, 18	Ep.
	1910 Sept. 7–1911 Jan. 16	32, 32	Hl.
	1911 Sept. 11–1912 Jan. 27	49, 49	Hl.
	1913 Oct. 4–1914 Mar. 4	66, 65	Hl.
	1914 Oct. 1–1915 Apr. 7	60, 60	Hl.
	1915 Oct. 25–1916 Apr. 10	26, 25	Hl.
	1925 May 12–July 14	20, 20	Hl.
		17, 17	Bn.
	1926 Apr. 2–July 21	15, 15	Hl.
		15, 15	Bn.
Hyperion-Titan	1908 Aug. 29–Oct. 20	12, 12	Hd.
	1910 Sept. 26–Oct. 5	4, 4	Hl.
	1911 Oct. 24–1912 Jan. 22	9, 9	Hl.
	1912 Oct. 15–1913 Jan. 14	14, 14	Bn.
	1913 Oct. 5–1914 Feb. 21	38p, 38 s	Hl.
		$4\Delta\alpha$, $4\Delta\delta$	Hl.
	1915 Oct. 29–1916 Mar. 23	14, 13	Hl.
Japetus-Titan	1908 Aug. 29–Oct. 26	12 p, 12 s	Hd.
		$5\Delta\alpha$, $5\Delta\delta$	Hd.
	1909 Oct. 25–Dec. 6	4 p, 4 s	Hl.
		$4\Delta\alpha$, $4\Delta\delta$	Hl.
		2 p, 2 s	Ep.
		$4\Delta\alpha$, $4\Delta\delta$	Ep.
	1910 Sept. 12–1911 Jan. 16	14 p, 13 s	Hl.
		$4\Delta\alpha$, $4\Delta\delta$	Hl.
	1911 Sept. 13–1912 Jan. 10	6 p, 6 s	Hl.
		23 p, 23 s	Bn
		$9\Delta\alpha$, $9\Delta\delta$	Bn.
	1913 Oct. 13–1914 Mar. 7	32 p, 32 s	Hl.
		$17\Delta\alpha$, $17\Delta\delta$	Hl.
	1915 Oct. 25–1916 Apr. 10	27 p, 25 s	Hl.
		$1\Delta\alpha$, $1\Delta\delta$	Hl.

The Satellites of Uranus.—These satellites were observed in position angle and distance as follows:

Combination	Observed	Number of Observations	Observer
Titania-Uranus	1908 June 4–Aug. 1	11, 10	Hl.
	1909 Apr. 23–July 19	15, 15	Hl.
	1910 July 5–Aug. 9	7, 7	Hl.
	1911 June 1–Sept. 13	16, 16	Ep.
	1920 Aug. 8–Nov. 13	13, 13	Hl.
	1921 Aug. 25–Nov. 25	11, 11	Hl.
	1922 Aug. 21–Sept. 26	2, 2	Hl.
		3, 3	B.
Oberon-Uranus	1909 Apr. 26–July 20	19, 15	Hl.
	1910 July 9–Aug. 9	6, 6	Hl.
	1911 June 9–Sept. 12	8, 8	Bn.
		9, 9	Ep.
	1920 Aug. 26–Nov. 13	12, 12	Hl.
	1921 Aug. 24–Nov. 25	10, 10	Hl.
	1922 Aug. 15–Sept. 26	3, 3	Hl.
		3, 3	B.
Oberon-Titania	1908 June 7–Aug. 2	11, 11	Hl.
	1910 July 5–Aug. 5	4, 4	Hl.
Ariel-Uranus	1921 Aug. 29	1, 1	Hl.
Titania-Umbriel	1911 July 19–July 27	3, 3	Ep.
Oberon-Umbriel	1911 July 27–Sept. 13	4, 4	Ep.
Oberon-Ariel	1911 July 31	1, 1	Ep.
Titania-Ariel	1911 Sept. 13	1, 1	Ep.

The planet being far south, the satellites of Uranus were usually observed within about 1¼ hours from the meridian. The seeing was somewhat improved when the planet was near the meridian. The satellites were faint and could be observed only on very clear nights. Single red wires were used at all oppositions except 1911.

In 1911 double movable red wires about 6″ apart were employed in the distance measures with respect to the planet, and a single wire in the measures of position angle. In the distance measures with respect to the planet bisections were made on the satellite with the double wires, the planet being bisected with a single wire. When the satellites were measured in pairs double wires were generally used on the fainter. Single wires were employed for Umbriel-Titania on July 19.

The micrometer was turned 180° for half the measures in a set in order to eliminate the necessity of taking readings for coincidence of the movable and fixed threads, although a small error was likely on account of the coincidence varying with the tension on the micrometer-screw spring when the micrometer was reversed. It was the intention to try a reversing prism in connection with the double threads, but on account of the faintness of the satellites and loss of light the prism was found to be undesirable and was used only twice.

When the satellites of Uranus were measured in pairs the planet was usually placed behind a narrow strip of black paper pasted on the field lens of the eyepiece.

The Satellite of Neptune.—Observations were obtained in position angle and distance with respect to the center of Neptune as follows:

Observed	Number of Observations	Observer
1908 Dec. 2–1909 Mar. 26	27, 25	Hl.
1909 Dec. 9–1910 Apr. 14	32, 29	Hl.
1911 Jan. 28–Mar. 31	{19, 16	Hl.
	{20, 19	Bn.
1911 Dec. 18–1912 Apr. 11	85, 85	Bn.
1912 Dec. 9–1913 May 8	{37, 37	Hl.
	{59, 59	Bn.
1918 Dec. 17–1919 Apr. 2	47, 47	Hl.
1919 Nov. 5–1920 May 4	26, 26	Hl.
1920 Dec. 14–1921 Apr. 11	23, 23	Hl.
1921 Dec. 19–1922 Apr. 22	{3, 3	Hl.
	{3, 3	B.
1923 Feb. 21–May 19	12, 12	Hl.
1925 Feb. 18–Apr. 13	11, 11	Hl.
1926 Jan. 20–May 5	5, 5	Hl.

Comparison of the elements of the satellite of Neptune derived from the observations at the oppositions of 1908–09 and 1909–10 with the elements in the Connaissance des Temps seemed to show a large personal equation in distance measures which were made with single red wires. In the measures of position angle a single red wire was passed through the center of the disk and the satellite. It was suspected that there might be a systematic error, due to unsymmetrical illumination of the short wires, in the case of Clark Micrometer II. In the Repsold micrometer the illumination is supposed to be symmetrical.

At the oppositions of 1910–11 and 1912–13 double movable wires about 6″ apart were used as described under the satellites of Uranus. It was the intention to use a reversing prism, but this was found to be possible only when the seeing was fine. At the other oppositions single wires were used, as in 1908–09. Single wires seem to be preferable to double for measuring very faint objects.

In general, a dark shade of red was preferred for bright wire illumination. Various colors were tried, but the red seemed to interfere less with the visibility of faint objects.

The eyepieces employed in observing faint objects were low or medium powers.

There were few nights when the seeing was good enough to permit the use of an eyepiece such as 8C (power 771). Eyepieces with friction fit were preferred to those with the screw-thread arrangement for focusing.

B. OBSERVATIONS OF DIAMETERS OF PLANETS AND WIDTHS OF SATURN'S RINGS

Object	Observed	Number of Observations	Observer
Mars	1909 Aug. 26–Oct. 8	15 equatorial, 14 polar	Hl.
Jupiter	1909 Mar. 17–Apr. 26	7 equatorial, 7 polar	Hl.
		6 equatorial, 6 polar	Fn.
		6 equatorial, 6 polar	Ep.
	1910 Apr. 22–Apr. 26	2 equatorial, 2 polar	Hl.
	1912 Apr. 12–June 1	14 equatorial, 14 polar	Hl.
		2 equatorial, 2 polar	Bn.
		1 equatorial, 1 polar	Ws.
Saturn	1909 Oct. 30	1 equatorial, 1 polar	Ep.
Ring A (outer ring)	1909 Oct. 30	1 outer, 1 inner	Ep.
Width of A	1913 Nov. 21–Dec. 20	2 east side, 2 west side	Bn.
Outer edge of A to Encke's division.	1913 Nov. 21–Dec. 20	2 east side, 1 west side	Bn.
Encke's division to inner edge of A.	1913 Nov. 21	1 east side, 1 west side	Bn.
Width of B	1913 Nov. 21–Dec. 20	2 east side, 2 west side	Bn.
Uranus	1911 Aug. 16–Sept. 11	5 equatorial	Ep.
	1912 July 2–July 3	1 in α, 1 in δ	Hl.
		1 in α, 1 in δ	Bn.
Neptune	1909 Mar. 22–Apr. 26	5 in α, 5 in δ	Hl.
		5 in α, 5 in δ	Fn.
		6 in α, 6 in δ	Ep.
	1912 Apr. 3–Apr. 11	3 in α, 2 in δ	Hl.

The observed values of all diameters were decreased by 0″.131, the average thickness of a spider wire, and reduced to unit distance.

Mars and Jupiter.—In addition to corrections for differential refraction, the observations were corrected for phase. Observations of the polar diameter were corrected also for inclination of the planet's equator to the line of sight. The equatorial diameter, $2a$, as corrected for phase is

$$2a=\frac{2m}{1+\sqrt{1-\sin^2 d \sin^2(Q-P)}}=p_D\cdot m$$

(planet considered spherical), where m = measured diameter.

d, Q, P are as previously defined in connection with the satellites of Mars.

A table with arguments d and $Q-P$ was formed giving log p_D in units of the fifth decimal place.

For the polar diameter the same table was used with the arguments d and $Q-P\pm 90°$.

The correction to the measured polar diameter for inclination was
$-(2a-2\rho)\tan^2 B$,
where

$2a$ = observed equatorial diameter.
2ρ = measured polar diameter.
B = planetocentric declination of Earth.

The polar diameter, $2b$, was then $2b=p_D\cdot 2\rho-(2a-2\rho)\tan^2 B$.

The quantities d, Q, P, and B were taken from the British Nautical Almanac.

Saturn and Rings.—The correction for differential refraction was applied, but the phase correction and correction for inclination were omitted.

In the observations by BURTON the attempt was made to set the wires on the limbs instead of tangent to them, thereby eliminating the correction for thickness of threads. This correction was therefore not applied.

The rings were measured along the major axis, the setting being taken from the American Ephemeris. The outer ring is designated by A and the middle ring by B.

Uranus.—In 1911 the equatorial diameter of Uranus was measured, assuming the plane of the equator to be very nearly at right angles to the mean of the position angles given in the Connaissance des Temps for the poles of the satellites' orbits. The planet was not in a good position for measures of the polar diameter. In 1912 diameters were measured in the direction of both right ascension and declination. The phase correction was negligible, and the corrections for differential refraction were only about $0''.001$ to $0''.005$.

Neptune.—All measures of diameters of Neptune were in the direction of both right ascension and declination. Corrections for phase and differential refraction were of about the same order as for Uranus.

C. OBSERVATIONS OF ASTEROIDS

The observations of each object are printed in chronological order. The observations were made either by transits or with the driving clock running, as described under Satellite VI of Jupiter.

The asteroids are arranged in order of the numbers assigned by the Astronomischen Rechen-Institut, which is in general the order of discovery. In a few instances the numbers to be assigned are not at hand.

A number of asteroids were observed at the request of Rev. J. H. METCALF of Winchester, Mass. Nos. (55) and (127) were observed for Prof. D. T. WILSON of the Case School of Applied Science, Cleveland, Ohio. Observations of (288) Glauke were obtained for the Bilk Observatory, Dusseldorf, Germany. A request for observations of asteroids belonging to the Jupiter group was received from Prof. ELIS STROMGREN of the University of Copenhagen, and some of these were observed. An ephemeris furnished by Miss JULIE M. VINTER HANSEN of the Copenhagen University Observatory was used in finding (588) Achilles.

One hundred and nineteen asteroids were observed, as follows:

Asteroid	Observed	Number of Observations	Observer
(1) Ceres	1915 Oct. 28	1	B.
	1917 Mar. 19–25	3	C.
	1923 June 9–Sept. 17	9	B.
(2) Pallas	1914 June 30	1	B.
	1923 Apr. 9–16	3	B.
(3) Juno	1915 Mar. 10–17	2	Wr.
	1917 July 23–Aug. 13	3	C.
	1923 Apr. 26	1	B.
(4) Vesta	1912 Mar. 10–Apr. 6	3	Ws.
	1915 Feb. 8–27	3	Wr.
	1916 Apr. 15–May 31	3	B.
	1917 Aug. 25–Oct. 15	4	C.
(5) Astraea	1917 Mar. 24–25	2	C.
(7) Iris	1917 July 23–Aug. 13	3	C.
(8) Flora	1917 Mar. 9	1	C.
(11) Parthenope	1916 Sept. 17–20	4	C.
(13) Egeria	1910 Apr. 2–14	3	Bn.
	1916 Oct. 6–10	2	C.
(15) Eunomia	1916 Sept. 9–Oct. 6	6	C.
	1918 Feb. 28	1	C.
(16) Psyche	1909 July 28	1	Fn.
(19) Fortuna	1908 Apr. 6–20	5	Fn.
	1909 July 24–Aug. 7	2	Ep.
	1917 Sept. 19–Oct. 15	3	C.
(22) Kalliope	1909 Apr. 16–26	3	Ep.
	1916 Oct. 10–27	2	C.
(28) Bellona	1908 Dec. 18–20	3	Ep.
	1910 Apr. 30–May 4	2	Bn.
(29) Amphitrite	1917 Oct. 6–Nov. 17	2	C.
(33) Polyhymnia	1917 Sept. 17–Oct. 15	4	C.
(39) Laetitia	1908 July 1–8	2	Fn.
	1918 Oct. 3–22	11	C.
(40) Harmonia	1908 July 29–Aug. 3	3	Fn.
(42) Isis	1909 Apr. 10–17	3	Ep.
(43) Ariadne	1909 Feb. 20	1	Ep.
(49) Pales	1908 Jan. 29	2	Fn.
	1917 Oct. 6–17	3	C.
(55) Pandora	1913 Sept. 11–Oct. 26	5	Ws.
(57) Mnemosyne	1909 Aug. 10–21	3	Fn.
(64) Angelina	1918 Mar. 17–19	2	C.
(68) Leto	1918 Nov. 6	3	C.
(78) Diana	1918 Mar. 2	1	C.
(79) Eurynome	1908 June 23–26	2	Fn.
(88) Thisbe	1917 Sept. 18–19	2	C.
(90) Antiope	1908 Feb. 6	1	Fn.
(93) Minerva	1908 Sept. 1–6	5	Fn.
(95) Arethusa	1909 Aug. 7	1	Ep.
	1910 Nov. 22–30	3	Ep.
(101) Helena	1908 Mar. 7–10	4 1	Fn. Hd.
	1918 Nov. 3–14	13	C.
(104) Klymene	1913 Oct. 22	1	Ws.
(105) Artemis	1908 Aug. 30–Sept. 18	5	Fn.
(111) Ate	1908 Aug. 31–Oct. 6	7	Fn.
(115) Thyra	1908 Sept. 30–Oct. 14	2	Fn.
	1912 Dec. 21–1913 Jan. 25	5	Ws.
(121) Hermione	1908 Jan. 27–30	5	Fn.
(127) Johanna	1913 Oct. 31–Nov. 21	6	Ws.

Asteroid	Observed	Number of Observations	Observer
(129) Antigone	1908 July 20	2	Fn.
(133) Cyrene	1908 Jan. 3–10	5	Hd.
(135) Hertha	1917 Oct. 17	1	C.
(150) Nuwa	1908 Feb. 1	1	Fn.
(161) Athor	1908 Jan. 3–10	5	Hd.
(182) Elsa	1908 Mar. 4–9	2	Fn.
(190) Ismene	1910 Nov. 26	1	Ep.
(192) Nausikaa	1918 Sept. 9–Oct. 22	12	C.
(198) Ampella	1908 Feb. 1–3	2	Fn.
	1918 Sept. 13–Oct. 3	7	C.
(202) Chryseis	1909 Mar. 23–28	3	Ep.
(203) Pompeja	1908 Jan. 27	2	Fn.
(221) Eos	1909 Apr. 15–22	3	Fn.
(229) Adelinda	1908 Oct. 26–Nov. 27	6 2	Hd. Hl.
(241) Germania	1909 Apr. 10–26	5	Fn.
	1910 July 24–25	2	Bn.
(246) Asporina	1912 May 24–June 3	2	Ws.
(288) Glauke	1909 June 15–July 6	5	Fn.
	1916 Nov. 27–Dec. 28	2 2	Hl. Bn.
	1918 May 1–June 5	2 3	Hl. B.
(323) Brucia	1924 Aug. 14–Dec. 10	7	B.
(329) Svea	1908 May 26–28	2	Fn.
(349) Dembowska	1914 Mar. 18–23	2	Ws.
(354) Eleonora	1908 June 2–6	2	Fn.
(387) Aquitania	1908 Apr. 19–20	4	Fn.
(402) Chloë	1908 June 8–28	1 6	Hd. Fn.
(415) Palatia	1913 Oct. 4–Nov. 7	2	Ws.
(433) Eros	1912 July 8–Aug. 6	3 4	Bn. Ws.
	1914 Aug. 9–1915 Apr. 17	23	Bn.
	1919 July 25–Aug. 2	3	Bn.
	1923 Oct. 13–1924 Feb. 8	2 9	Hl. B.
(447) Valentine	1918 May 8–June 12	7	Bn.
(451) Patientia	1912 Apr. 10–11	2	Ws.
(454) Mathesis	1908 Feb. 2	1	Fn.
(465) Alekto	1908 June 27–Aug. 3	7	Fn.
(480) Hansa	1911 Nov. 21–22	2	Ep.
(491) Carina	1912 June 12–20	3	Bn.
(492) Gismonda	1913 Oct. 5	1	Ws.
(495) Eulalia	1908 Mar. 25–Apr. 4	2 2	Hd. Fn.
(506) Marion	1908 Feb. 8–20	3	Fn.
(507) Laodica	1908 Jan. 9	1	Fn.
(532) Herculina	1908 Jan. 5–15	6	Fn.
(534) Nassovia	1908 Feb. 24–Mar. 4	1 2	Fn. Hd.
(536) Merapi	1909 Mar. 22–26	3	Fn.
(537) Pauly	1914 Apr. 2–21	6	Bn.
(547) Praxedis	1908 July 17	2	Fn.
(554) Peraga	1909 Mar. 17–22	3	Fn.
	1918 Sept. 14–Oct. 7	7	C.
(569) Misa	1910 Dec. 8–21	3	Ep.
(588) Achilles	1919 Apr. 26–May 3	4	Bn.
(600) Musa	1909 Jan. 26–28	3	Fn.

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Asteroid	Observed	Number of Observations	Observer
(611) Valeria	1908 Feb. 4–Mar. 24	5	Fn.
		2	Hd.
(622) Esther	1908 Apr. 3–May 2	1	Hd.
		2	Fn.
(624) Hektor	1913 Aug. 25–Oct. 3	6	Bn.
	1915 Nov. 1–3	3	Bn.
(636) Erika	1908 Apr. 3–6	3	Hd.
(638) Moira	1908 Sept. 29–Oct. 2	2	Fn.
(645) Agrippina	1909 Jan. 21–22	2	Fn.
(651) Antikleia	1912 Oct. 16–Nov. 29	3	Ws.
		3	Bn.
(654) Zelinda	1908 Jan. 29–Mar. 14	4	Fn.
		2	Hd.
(655) Briseis	1909 Feb. 25–Mar. 17	5	Ep.
(659) Nestor	1925 Oct. 15–Nov. 9	4	Bn.
(660) Crescentia	1908 Jan. 12–Mar. 24	5	Hd.
		5	Fn.
	1909 May 8–June 15	5	Fn.
(661) Cloelia	1908 Feb. 26–Apr. 3	7	Hd.
		3	Fn.
(662) Newtonia	1908 May 2	1	Fn.
(675) Ludmilla	1908 Sept. 1–Oct. 18	11	Fn.
(690) Wratislawia	1911 Jan. 23–28	4	Ep.
(712) Boliviana	1918 Sept. 27	1	C.
(718) Erida	1914 Mar. 20–23	2	Bn.
(738) Alagasta	1908 Feb. 24–Mar. 3	2	Hd.
(755) Quintilla	1908 May 2–June 5	3	Fn.
(756) Lilliana	1908 May 23–June 5	4	Fn.
(757) Portlandia	1908 Oct. 4–1909 Jan. 25	9	Fn.
(784) Pickeringia	1914 Mar. 26–Apr. 21	5	Ws.
(796) Sarita	1914 Dec. 21–27	2	Bn.
(856) Backlunda	1908 Feb. 21–28	4	Hd.
(886) Washingtonia	1917 Nov. 24–1918 Mar. 15	2	Bn.
		2	Hl.
		8	B.
(925) Alphonsina	1920 Jan. 28–Mar 18	8	B.
(950) Ahrensa	1921 Apr. 11	1	B.
(1001) Gaussia	1907 Dec. 31–1908 Jan. 8	2	Hd.
		1	Fn.
(1009) 1923 PE	1923 Nov. 10–Dec. 12	8	B.
(1036) Ganymed	1924 Oct. 29–1925 Mar. 23	54	B.
1908 a	1908 Feb. 1	1	Fn.
1908 CG	1908 Feb. 24–Mar. 4	3	Hd.
1908 CY	1908 May 2	1	Fn.
1908 DA	1908 Apr. 30–May 2	2	Fn.
1908 DB	1908 Apr. 30	1	Fn.
1908 EKa	1908 Oct. 26–Nov. 18	5	Hd.

D. OBSERVATIONS OF COMETS

The comets are arranged in general in the order of announcement of discovery or rediscovery. In some cases the names of more than one discoverer are given, separated by a hyphen. In this connection the Comet Catalogue prepared by A. C. D. Crommelin was consulted. (Memoirs of the British Astronomical Association, Volume XXVI, Part 2.)

A number of comet observations were made with the 12-inch equatorial, some of which were taken with that instrument on account of being able to observe nearer the horizon than with the 26-inch.

Fifty-five comets were observed as follows:

Comet	Approximate Period (sidereal years)	Observed	Number of Observations	Observer
Daniel (1907d)		1908 Feb. 3	1	Fn.
Morehouse (1908c)		1908 Sept. 6–Dec. 3	9 2 7	Fn. Hd. Hl.
Borrelly (1909a)		1909 June 18–July 19	6	Fn.
Perrine (1909b)	6. 5	1909 Oct. 7–Oct. 8	2	Fn.
Halley (1909c)	76. 0	1909 Oct. 9–1910 June 7	1 21 7	Fn. Ep. Hl.
Daniel (1909e)	6. 5	1909 Dec. 10–1910 Jan. 15	4	Ep.
——— (1910a)		1910 Jan. 25–Apr. 9	5	Ep.
Metcalf (1910b)		1910 Aug. 10–Sept. 28	2 4	Bn. Ep.
D'Arrest (1910c)	6. 5	1910 Aug. 30	1	Ep.
Faye (1910e)	7. 4	1910 Nov. 11–1911 Feb. 4	7	Ep.
Kiess (1911b)		1911 July 9–Aug. 9	4	Ep.
Brooks (1911c)		1911 July 24–Oct. 23	2 6	Bn. Ep.
Quénisset (1911f)		1911 Sept. 25–Oct. 16	3 1	Ep. Bn.
Beljawsky (1911g)		1911 Sept. 30–Oct. 4	2	Ep.
Gale (1912a)		1912 Sept. 28–1913 Apr. 5	6 5	Ws. Bn.
Tuttle (1912b)	13. 5	1912 Nov. 9	1	Bn.
Borrelly (1912c)		1912 Nov. 5–Nov. 16	3	Ws.
Schaumasse (1913a)		1913 May 8–June 29	6	Ws.
Metcalf (1913b)		1913 Sept. 4–Nov. 2	5	Ws.
Neujmin (1913c)	18	1913 Sept. 9–Oct. 22	4 1	Bn. Ws.
Westphal (1913d)	61. 7	1913 Sept. 27–Oct. 4	1 1	Bn. Ws.
Giacobini (1913e)	6. 5	1913 Oct. 26–Nov. 6	4	Ws.
Delavan (1913f)		1913 Dec. 18–1915 Jan. 20	20 4	Bn. Ws.
Kritzinger (1914a)		1914 Mar. 30–June 29	6	Ws.
Zlatinsky (1914b)		1914 May 21–June 2	5	Bn.
Neujmin (1914c)		1914 July 28	1	Ws.
Campbell-Westland-Lunt (1914e).		1914 Oct. 1–Nov. 19	7	Bn.
Mellish (1915a)		1915 Feb. 17–1916 Jan. 8	18	Bn.
Taylor (1915e)	6. 4	1915 Dec. 6–1916 Mar. 31	10	Bn.
Neujmin (1916a)	5. 4	1916 Mar. 4–May 5	4	Bn.
Wolf (1916b)		1916 May 6–1917 Dec. 10	31 9	Bn. B.

Comet	Approximate Period (sidereal years)	Observed	Number of Observations	Observer
Mellish (1917a)		1917 Mar. 22–Mar. 30	3	Bn.
Schaumasse (1917b)		1917 May 1–June 16	6	Bn.
Wolf (1918b)	6. 8	1918 July 15–1919 Mar. 3	25	Bn.
Borrelly (1918e) = (1925f)	6. 9	1918 Oct. 23–1919 Apr. 21	3 15	Bn. B.
		1925 Nov. 18–1926 Feb. 6	5	Bn.
Schorr (1918d)	6. 7	1918 Nov. 29–Dec. 2	3	Bn.
Brorsen (1919b)	69–72	1919 Aug. 22–Sept. 13	3 2	B. Bn.
Metcalf-Borrelly (1919e)		1919 Aug. 25–Oct. 3	5 2	B. Bn.
Finlay (1919d)	6. 7	1919 Nov. 13–Dec. 22	7	B.
Tempel II (1920b) = (1925d)	5. 2	1920 July 26–Nov. 4	6	B.
		1925 June 16–July 22	4	Bn.
Taylor-Skjellerup (1920c)		1920 Dec. 20–1921 Feb. 14	3	Bn.
Reid (1921a)		1921 Mar. 22–May 31	8	B.
Pons-Winnecke (1921b)	6. 0	1921 May 9–June 14	4	B.
Dubiago (1921c)	79. 5	1921 May 25–May 31	2	B.
Grigg-Skjellerup (1922b) = Grigg (1902e).	5. 0	1922 May 23–June 21	5	B.
Baade (1922e)		1922 Oct. 24–1923 Dec. 1	10 14	Hl. B.
Skjellerup (1922d)		1922 Dec. 5	1	B.
Encke (1924b)	3. 3	1924 Sept. 3–Oct. 22	19	B.
Finsler (1924e)		1924 Sept. 23–Oct. 13	10	B.
Schain-Comas Solà (1925a)		1925 Mar. 25–June 16	1 6	B. Bn.
Reid (1925b)		1925 Mar. 28–May 19	1 4	B. Bn.
Orkisz (1925e)		1925 Apr. 7–July 18	7	Bn.
Tempel II (1925d) = (1920b)				
Borrelly (1925f) = (1918e)				
Van Biesbroeck (1925j)		1925 Nov. 18–1926 Feb. 15	9	Bn.
Peltier-Wilk (1925k)		1925 Nov. 21–Dec. 10	4	Bn.
Blathwayt (1926b)		1926 Feb. 16	1	Bn.

E. OBSERVATIONS OF OCCULTATIONS

Occultations published in the American Ephemeris for observation at Washington have been observed with both instruments as part of the regular program.

Occulting bars of black paper have sometimes been used on two of the eyepieces for observations at the bright limb, or dark limb if near full Moon. The bar obscures all of the Moon except a small area where the star is to disappear or reappear. This arrangement is helpful in cutting off the glare of the Moon, especially when a low-power eyepiece is used; but sometimes an observer may find the glare sufficiently reduced by using an eyepiece of higher power without the bar. The occulting bar is pasted to the field lens of the eyepiece so as not to interfere with the micrometer wires, but it would be more efficient if it could be in the focal plane.

Unless otherwise noted it will be understood that the observations were recorded on a chronograph in sidereal time. A number of observations were recorded by eye and ear, indicated by the letter *i*.

An observation of an occultation of a star by Venus (disappearance at the bright limb only) follows the occultations by the Moon.

F. OBSERVATIONS OF SOLAR ECLIPSES AND TRANSIT OF MERCURY

Solar eclipses were observed for times of contact on the following dates: 1908, June 27; 1914, August 20; 1916, February 3; 1918, June 8; 1920, November 10; 1923, September 10; and 1925, January 24. A transit of Mercury (egress) was observed on November 6, 1914.

The instruments used were: The 26-inch equatorial (reduced to 12-inch aperture) with a Herschel solar eyepiece; the 5-inch finder (reduced to 1-inch aperture) of the 26-inch; the 12-inch equatorial (reduced to 4-inch aperture or used with full aperture) with a solar eyepiece or helioscope, usually the polarizing eyepiece John A. Brashear, No. 16; and a number of Clark 5-inch Transit-of-Venus equatorials (used with full aperture) with diagonal eyepieces and dark glass. Most of the 5-inch equatorials were mounted on the roof of the main building; one was mounted on the porch of the superintendent's residence.

The observers were J. A. Hoogewerff (Superintendent), H. E. Smith, F. B. Littell, A. Hall, J. C. Hammond, G. A. Hill, C. W. Frederick, M. Frederickson, H. E. Burton, E. C. Bower, C. B. Watts, Paul Sollenberger, and G. C. Whittaker.

The observations with the 26-inch and 12-inch equatorials were recorded on the chronograph except on January 24, 1925, when the eye-and-ear method of recording was used. With the other instruments the eye-and-ear method was usually employed, the seconds beat of a meantime chronometer being counted aloud by an assistant. Mr. Hill used a stop watch for the time of the last contact on January 24, 1925.

G. OBSERVATIONS OF ECLIPSES OF SATELLITES

Disappearances and reappearances (D. and R.) of Satellites eclipsed by the primaries were as follows:

Satellite	Phenomenon	Observed	Number of Observations	Observer
Satellite I of Jupiter	D.	1921 Jan. 16–Feb. 24	3 1	Hl. B.
	R.	1921 Mar. 23–May 8	4 2	Hl. B.
	D.	1922 Jan. 5–Mar. 8	5 3	Hl. B.
	R.	1922 Apr. 18–June 3	3 1	Hl. B.
	D.	1924 Apr. 23	1 1	Hl. B.
	R.	1924 June 26–July 26	1 2	Hl. B.
	R.	1926 Aug. 28–Oct. 20	3 2	Hl. Bn.
Satellite II of Jupiter	D.	1921 Jan. 18–Feb. 12	2 2	Hl. B.
	R.	1921 Mar. 27	1	Hl.
	D.	1922 Jan. 12	1 1	Hl. B.
	D.	1924 Apr. 12	1	Hl.
	R.	1924 July 3–10	2	Hl.
	D.	1926 July 13–Aug. 6	2 1	Hl. Bn.
Dione (satellite of Saturn)	D.	1908 Aug. 3	1	Hl.

H. OBSERVATIONS OF DOUBLE STARS

Double stars were measured in position angle and distance with reference to the brighter component as follows:

Star	α(1900.0)	δ(1900.0)	Observed	Number of Observations	Observer
	h m	° ′			
Anonymous (12^m, 12^m)	2 24	+15 10	1908	1, 1	Hd.
BD+46° 1356 (10^m, 10^m)	8 1	+46 29	1914	1, 1	Ws.
70 Ophiuchi system	18 0	+ 2 31			
A and *B* (4^m, 6^m)			1918	2, 2	Hl.
			1919	3, 3	B.
			1924	5, 5	B.
A and *a*			1918	1, 1	Hl.
			1919	3, 3	B.
			1924	4, 4	B.
A and *b*			1919	3, 3	B.
			1924	4, 4	B.
A and *c*			1918	1, 1	Hl.
			1919	2, 2	B.
			1924	4, 4	B.
A and *d*			1918	1, 1	Hl.
			1919	3, 3	B.
			1924	4, 4	B.
A and *e*			1918	1, 1	Hl.
			1919	2, 2	B.
			1924	4, 4	B.
A and *f*			1919	3, 3	B.
			1924	4, 4	B.
A and *g*			1918	1, 1	Hl.
			1919	3, 3	B.
			1924	4, 4	B.
A and anonymous			1924	1, 1	B.

The observations of the system of 70 Ophiuchi were made at the request of Dr. A. D. Risteen, of Hartford, Conn. The star designations for this system are those found in Burnham's General Catalogue, page 775. An additional star, anonymous, is included.

I. OBSERVATIONS OF MISCELLANEOUS STARS, NOVÆ, AND NEBULÆ

The miscellaneous stars include step stars, or stars which were selected as comparison stars, and at the time were not found in a catalogue. By means of a step star an observation of an object was reduced with reference to a catalogue star.

Following the miscellaneous stars are Novæ with notes as to their appearance, and Nebulæ.

J. MISCELLANEOUS OBSERVATIONS

Under this heading are included observations and notes pertaining to the following subjects: Polar Cap of Mars, Jupiter's Cloud Forms, Saturn and Rings, Meteors, an Aurora, and examination of faint objects in the field around Uranus.

IV. GENERAL REMARKS

The seeing was indicated in two ways, as follows: 1=e=excellent, 2=g=good, 3=f=fair, 4=p=poor, 5=b=bad; v=very (used with g, p, or b).

Observers.[1] R=Rice, Hl=Hall, Hd=Hammond, H=Hill, P=Peters, Fn=Frederickson, Ep=Eppes, Bn=Burton, Ws=Watts, Wr=Webster,

[1] See page 3 et seq.

B = BOWER, C = CONRAD, WL = WILLIS. Messrs. GUSTAVE HARRISON, J. E. WILLIS, U. S. LYONS, and W. C. MYERS occasionally recorded for the observers on the 26-inch equatorial.

A correction of +0.10 inch has been applied to the aneroid barometer readings. The index correction to the thermometer was negligible.

Except for occasional observations the Repsold micrometer was used after June 30, 1914.

When a prism eyepiece was employed for satellite measures the wire used in measuring position angles was generally placed apparently vertical; in measuring distances the short wires were placed apparently vertical. In measuring $\Delta\delta$ by transits for screw value the short wires were placed apparently vertical.

Catalogue proper motions have in general been applied to the positions of comparison stars.

When more than one authority is mentioned for the position of a star equal weight is assigned in taking the mean unless otherwise stated.

A star taken from an astrographic catalogue in which the coordinates are not already expressed in right ascension and declination is designated by the name of the catalogue followed by the coordinates of the plate center (in degrees of declination and hours and minutes of right ascension), and the number assigned to the star in the catalogue.

In computing precessions Newcomb's precession constants were used throughout, except for the observations by CONRAD who used the catalogue precessions. The apparent place reductions of the comparison stars were obtained by use of the formulæ and constants given in the American Ephemeris, except for the years 1909, 1910, and 1911 when the formulæ and constants given in the Star List of the American Ephemeris were used.

The clock corrections were based on Newcomb to October 27, 1914; Boss, October 27, 1914, to January 1, 1923; and the American Ephemeris, as corrected by Table XIII of 1925, from January 1, 1923.

Throughout Part I of this volume the astronomical dates are used as employed before 1925. The change to civil time was NOT made for the observations of 1925, 1926.

ABBREVIATIONS

In addition to the designations previously given for seeing and observers, a number of the following abbreviations have been used:

(a) *Star Catalogues in α and δ*

(1) ASTRONOMISCHE GESELLSCHAFT ZONES

[When A G precedes abbreviation]

Alb. = Albany.
Alg. = Algiers.
Ber. A = Berlin A.
Ber. B = Berlin B.
Ber. C = Berlin C.
Bo. = Bonn.
Cam. = Cambridge, Eng.
Chr. = Christiania.
Har. = Harvard.
Hels. = Helsingfors-Gotha.
Kas. = Kasan.
Lei. = Leiden.
Lpz. I = Leipzig I.
Lpz. II = Leipzig II.
Lu. = Lund.
Nic. = Nicolajew.
Ott. = Wien-Ottakring = Wien-Ott.
Str. = Straszburg.
Wa. = Washington.

NOTE.—A G Cambridge, U. S. is called A G Harvard.

(2) MISCELLANEOUS

Abb. A = Abbadia A, Zone +16° à +24°.
Abb. B = Abbadia B, Zone +4° à −2°.
Boss = Preliminary General Catalogue = P. G. C.
Ci. 18 = Cincinnati Publications No. 18.
Cor. A = Cordoba A.
Cor. B = Cordoba B.
Cor. C = Cordoba C.
Gr. Ast. = Greenwich Astrographic Cat. Vol. III.
Gr. 1910 = Greenwich Catalogue for 1910.
Newcomb = Catalogue of Fundamental Stars.
P. G. C. = Preliminary General Catalogue by Boss.

(b) *Astrographic Catalogues*

[When *Ast* precedes abbreviation]

Grn. = Greenwich.
Rom. = Rome (Vatican).
Cat. = Catania.
Hel. = Helsingfors.
Pot. = Potsdam.
Oxf. = Oxford (University).
Par. = Paris.
Bor. = Bordeaux.
Tou. = Toulouse.
Alg. = Algiers.
Fer. = San Fernando.
Tac. = Tacubaya.
Hyd. = Hyderabad.
Cor. = Cordoba.
Per. = Perth.

(c) *Observations of Occultations*

c = cloudy; thin clouds.
d = daylight.
e = early.
f = star faint.
g = gradual.
h = haze.
i = eye and ear.
k = dark limb visible.
l = late.
o = fogged eyepiece.
p = poor observation.
r = good {disappearance. / reappearance.}
s = some; a little.
t = twilight; dawn.
u = uncertain.
v = very.
w = windy.

Numbers following *e*, *l*, or *u* are estimates in tenths of seconds of time.
A, B, C, etc., refer to footnotes.

ALSO: UNDER PH (PHENOMENON)

D. B. = disappearance at bright limb.
D. D. = disappearance at dark limb.
D. E. = disappearance at eclipsed limb.
R. B. = reappearance at bright limb.
R. D. = reappearance at dark limb.
R. E. = reappearance at eclipsed limb.

(d) *Illumination of Field of View*

Blk. = Black wires in field illuminated otherwise than by artificial light; e. g., by Moon, planet, or daylight.
Brt. = Bright field of suitable intensity, artificially illuminated, showing black wires.
Red = Dark red wires.
red = Light red wires.

(e) *Accessories to Eyepieces*

After number indicating magnifying power of eyepiece;
b. = occulting bar pasted to field lens of eyepiece.
p. = with totally reversing prism in front of eye lens.
r. = red glass outside of field lens.
s. = smoked glass outside of field lens.

(*f*) *Position of Micrometer Head*

d. = down   lt. = left   rt. = right   u. = up

(*g*) *Miscellaneous*

A. J. = Astronomical Journal.
A. N. = Astronomische Nachrichten.
App. pl. = Apparent place.
Ast. = Astrographic.
B. D. = Bonn Durchmusterung.
Beg. = Beginning.
C. = Computed.
C. D. = Cordoba Durchmusterung.
Clds. = Clouds.
c. w. = Compared with.
d. = Diameters; driving clock running (measures made with).
Ft. = Faint; feet.
Gr. M. T. = G. M. T. = Greenwich Mean Time.
L. = Lower culmination.
N. G. C. = Dreyer's New General Catalogue (of Nebulæ and Clusters of Stars).
O., Obs. = Observed.
ρ. = Position angle.
p. e. = Probable error.
Ph., Phen. = Phenomenon; Phenomena.
Pr. = Power (magnifying).
R., r., Rev. = Revolutions (of the micrometer screw)
r. = Probable error; radians.
Red. = Reduction.
Rem. = Remarks.
T. = Temperature (Fahrenheit); telescope.
t. = Transits (measures made by).
Tr. = Transit (wires).
U. = Upper culmination.
V. = Very.
Var. = Variable.
Wash. = Washington.
W. M. T. = Washington Mean Time (counted from noon).
W. Sid. T. = Washington Sidereal Time.

OBSERVATIONS OF SATELLITES

Throughout Part I of this volume the astronomical dates are used as employed before 1925

SATELLITES OF MARS

PHOBOS—MARS

Date	W. M. T.	Δα cos δ	W. M. T.	Δδ	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1909	h m s	"	h m s	"			in.			
Aug. 23	12 55 32	+26. 66	13 13 34	+15. 57	4, 4	3	26	360r, Red.	Hl.	Clock ran badly.
23	13 47 17	+18. 80	13 31 40	+16. 72	4, 4	3	26	360r, Red.	Hl.	
24	12 5 1	+25. 38	12 21 32	+15. 92	4, 4	2–3	26	360r, Red.	Hl.	
24	-- -- --	-----	12 35 42	+16. 34	0, 2	2–3	26	360r, Red.	Hl.	Too ft. to finish.
25	14 55 10	−26. 48	15 6 48	−16. 64	4, 4	3	26	360r, Red.	Hl.	
25	15 38 31	−17. 81	15 19 49	−17. 03	4, 4	3	26	360r, Red.	Hl.	
26	13 23 36	−27. 05	13 35 23	−13. 17	4, 4	3	26	360r, Blk.	Hl.	
26	14 2 12	−25. 29	13 47 47	−15. 04	4, 4	3	26	360r, Blk.	Hl.	
Sept. 5	11 48 5	−20. 57	-- -- --	-----	5, 0	3	26	360r, Blk.	Hl.	Too close to planet to finish.
5	14 57 44	+27. 79	15 14 58	+17. 77	4, 4	3	26	360r, Blk.	Hl.	
5	-- -- --	-----	15 31 48	+18. 20	0, 4	3	26	360r, Blk.	Hl.	Sat. went out.
7	12 48 33	+28. 09	13 2 20	+17. 05	4, 4	2	26	360r, Blk.	Hl.	
7	13 26 40	+21. 23	13 14 58	+17. 87	4, 4	2	26	360r, Blk.	Hl.	Fog.
8	10 55 7	+25. 31	11 4 39	+ 7. 81	4, 4	2	26	360r, Red.	Hl.	
8	11 27 8	+29. 94	11 14 22	+ 9. 89	4, 4	2	26	360r, Red.	Hl.	
8	11 51 3	+27. 63	12 0 33	+17. 02	4, 4	2	26	360r, Red.	Hl.	
8	12 33 22	+18. 13	12 16 17	+18. 18	4, 4	2	26	360r, Red.	Hl.	
10	13 0 22	−29. 65	13 13 28	−13. 40	4, 4	2	26	360r, Red.	Hl.	
10	13 32 11	−28. 95	13 23 29	−15. 14	4, 4	2	26	360r, Red.	Hl.	
12	12 11 34	−20. 23	12 33 17	−17. 62	4, 6	2–3	26	360r, Red.	Hl.	Sat. went out.
13	11 2 38	−21. 93	11 14 51	−18. 68	4, 4	2–3	26	360r, Blk.	Hl.	
13	-- -- --	-----	11 22 56	−18. 30	0, 2	2–3	26	360r, Blk.	Hl.	Clouded.
14	11 59 1	+21. 15	12 10 33	+ 3. 19	4, 4	2–3	26	360r, Blk.	Hl.	
14	12 29 50	+27. 82	12 18 55	+ 5. 20	4, 4	2–3	26	360r, Blk.	Hl.	
17	13 8 27	−28. 43	13 23 14	−10. 96	4, 4	3–4	26	360r, Blk.	Hl.	
17	13 57 23	−29. 18	13 39 44	−14. 31	4, 4	3–4	26	360r, Blk.	Hl.	
18	11 42 39	−23. 66	11 51 39	− 4. 89	4, 4	3	26	360r, Blk.	Hl.	
18	12 12 30	−29. 08	11 59 26	− 6. 20	4, 4	3	26	360r, Blk.	Hl.	
18	13 24 38	−22. 72	13 33 50	−18. 70	4, 4	3–4	26	360r, Blk.	Hl.	
18	13 59 40	−13. 22	13 42 47	−18. 70	4, 4	3–4	26	360r, Blk.	Hl.	
21	10 2 41	−26. 33	10 15 30	−18. 74	4, 4	3	26	360r, Blk.	Hl.	Haze.
21	10 33 55	−18. 13	10 24 16	−18. 77	4, 4	3	26	360r, Blk.	Hl.	Haze.
22	11 33 8	+25. 41	11 44 39	+ 6. 30	4, 4	2	26	360r, Blk.	Hl.	
22	12 3 41	+29. 43	11 53 1	+ 8. 51	4, 4	2	26	360r, Blk.	Hl.	
24	10 32 39	+28. 02	10 42 28	+16. 95	4, 4	5	26	360r, Blk.	Hl.	
24	11 7 5	+19. 84	10 55 54	+17. 80	4, 4	5	26	360r, Blk.	Hl.	
25	12 48 37	−30. 03	13 4 19	−14. 57	4, 4	3–4	26	360r, Blk.	Hl.	
25	13 45 49	−23. 14	13 23 5	−16. 92	4, 4	3–4	26	360r, Blk.	Hl.	
30	11 3 0	+27. 66	11 13 22	+ 8. 20	4, 4	3	26	360r, Blk.	Hl.	
30	11 33 18	+29. 32	11 22 17	+10. 20	4, 4	3	26	360r, Blk.	Hl.	
Oct. 2	9 49 13	+27. 66	10 3 3	+16. 67	4, 4	3	26	360r, Blk.	Hl.	
2	10 33 0	+17. 22	10 16 25	+16. 93	2, 4	3	26	360r. Blk.	Hl.	Sat. went out.
4	10 22 55	−23. 98	10 38 24	− 5. 54	4, 4	2	26	360r, Blk.	Hl.	
4	11 13 58	−29. 09	10 54 33	− 8. 76	4, 4	2	26	360r, Blk.	Hl.	
5	10 7 34	−29. 25	10 23 14	−14. 12	4, 4	3	26	360r, Blk.	Hl.	
5	11 29 36	−12. 74	10 41 13	−16. 51	4, 4	3	26	360r, Blk.	Hl.	
6	8 50 50	−28. 32	9 5 13	−11. 52	4, 4	2	26	360r, Blk.	Hl.	
6	9 34 22	−26. 31	9 19 46	−13. 74	4, 4	2	26	360r, Blk.	Hl.	
7	12 41 7	+22. 23	12 53 46	+16. 73	4, 4	3	26	360r, Blk.	Hl.	
7	-- -- --	-----	13 10 37	+16. 00	0, 4	3	26	360r, Blk.	Hl.	Sat. went out.
8	8 32 2	− 8. 70	8 42 48	−14. 70	4, 4	1–2	26	360r, Blk.	Hl.	Close to planet. Haze.
9	10 7 51	+26. 72	10 21 30	+15. 31	4, 4	2–3	26	360r, Blk.	Hl.	
9	10 44 53	+19. 53	10 32 21	+15. 90	4, 4	2–3	26	360r, Blk.	Hl.	
9	12 49 17	−23. 46	13 8 56	− 6. 02	4, 4	3–4	26	360r, Blk.	Hl.	
9	13 47 11	−28. 16	13 28 54	− 9. 64	4, 4	3–4	26	360r, Blk.	Hl.	
16	10 5 47	+26. 72	10 17 37	+10. 64	4, 4	3–4	26	360r, Blk.	Hl.	
16	10 35 14	+24. 96	10 27 37	+12. 41	4, 4	3–4	26	360r, Blk.	Hl.	

SATELLITES OF MARS

PHOBOS—MARS—Continued

Date	W. M. T.	Δa	W. M. T.	Δd	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1911	h m s	"	h m s	"			in.			
Nov. 2	13 19 26	−24. 48	13 4 52	−1. 10	4, 4	3	26	360r, Blk.	Hl.	V. ft.
2	13 25 30	−24. 15	13 41 45	−1. 60	4, 4	3	26	360r, Blk.	Hl.	
10	-- -- --	-----	9 19 7	+2. 18	0, 4	3–4	26	388s, Blk.	Bn.	V. ft. Too ft. to finish.
16	10 0 22	+25. 06	9 50 52	+0. 18	4, 4	2	26	388s, Blk.	Hl.	
16	10 4 9	+25. 20	10 11 59	+1. 39	4, 4	2	26	388s, Blk.	Hl.	
16	-- -- --	-----	10 16 45	+1. 21	0, 4	3–4	26	388s, Blk.	Hl.	Too ft. to finish.
16	13 16 34	−23. 46	13 30 51	+0. 26	4, 4	3	26	388s, Blk.	Hl.	Not difficult.
16	13 47 37	−25. 63	13 35 53	+0. 38	4, 4	3	26	388s, Blk.	Hl.	
19	10 26 45	−25. 31	10 40 22	−0. 07	4, 4	3	26	388s, Blk.	Hl.	
19	11 6 56	−23. 62	10 52 6	−1. 07	4, 4	3	26	388s, Blk.	Hl.	
21	11 43 25	+21. 65	11 52 49	−1. 33	4, 4	2–3	26	388s, Blk.	Hl.	
21	12 6 17	+24. 51	11 56 49	−1. 20	4, 4	2–3	26	388s, Blk.	Hl.	
21	12 24 19	+25. 18	12 40 18	+1. 22	4, 4	2–3	26	388s, Blk.	Hl.	
21	12 58 26	+21. 63	12 45 39	+1. 23	4, 4	2–3	26	388s, Blk.	Hl.	
22	10 25 22	+18. 21	10 37 32	−2. 04	4, 4	2	26	388s, Blk.	Hl.	Haze.
22	10 57 53	+24. 03	10 43 20	−1. 57	4, 4	2	26	388s, Blk.	Hl.	
25	8 59 25	+19. 05	8 41 45	+2. 00	4, 4	3	26	388s, Blk.	Hl.	Too poor to finish.
25	-- -- --	-----	12 9 43	−0. 93	0, 4	2	26	388s, Blk.	Hl.	Stopped by haze.
26	10 42 57	−24. 14	10 18 1	+1. 95	4, 4	3	26	388s, Blk.	Hl.	
26	10 49 40	−24. 61	11 1 36	−0. 61	4, 4	3	26	388s, Blk.	Hl.	
Dec. 5	9 11 39	−23. 71	9 25 10	−1. 30	4, 4	2	26	388s, Blk.	Hl.	
5	9 45 1	−21. 76	9 32 13	−1. 66	4, 4	2	26	388s, Blk.	Hl.	
5	10 0 4	−19. 27	10 19 16	−4. 21	4, 3	2–3	26	388s, Blk.	Hl.	
7	11 36 46	+19. 75	11 47 17	+4. 28	4, 4	2	26	388s, Blk.	Hl.	Moonlight. Haze.
7	12 3 14	+14. 07	11 53 41	+4. 67	2, 4	2	26	388s, Blk.	Hl.	Too close to planet to finish.
10	12 10 29	−20. 95	12 21 55	−3. 41	4, 2	2	26	388s, Blk.	Hl.	Sat. went out.
19	10 1 39	−21. 62	-- -- --	-----	4, 0	2–3	26	388s, Blk.	Hl.	Ft.
1913										
Dec. 20	12 19 34	+20. 12	12 28 17	+0. 12	4, 4	2	26	360r, Blk.	Bn.	
20	12 45 9	+19. 93	12 38 21	−0. 22	4, 4	2	26	360r, Blk.	Bn.	
20	12 54 54	+19. 13	13 4 18	−1. 68	4, 4	2	26	360r, Blk.	Bn.	
20	-- -- --	-----	13 12 15	−1. 59	0, 4	2	26	360r, Blk.	Bn.	Too close to planet to finish. Fog.
27	9 13 58	−20. 38	9 22 30	+0. 80	4, 4	2–3	26	360r, Blk.	Bn.	
27	9 41 14	−17. 24	9 29 55	+1. 14	4, 4	2–3	26	360r, Blk.	Bn.	
27	13 11 14	+20. 00	13 23 19	−1. 10	4, 4	2	26	360r, Blk.	Bn.	Haze.
29	10 54 57	+20. 55	11 1 38	−0. 79	4, 4	2	26	360r. Blk.	Bn.	
29	11 18 18	+18. 26	11 8 23	−1. 00	4, 4	2	26	360r, Blk.	Bn.	
29	11 34 7	+15. 77	11 43 15	−1. 77	4, 4	2	26	360r, Blk.	Bn.	Close to planet.
29	14 45 53	−20. 83	14 52 4	+0. 49	4, 4	2	26	360r, Blk.	Bn.	
29	15 12 25	−18. 19	15 3 51	+0. 79	4, 4	2	26	360r, Blk.	Bn.	
1914										
Jan. 5	10 52 44	+20. 74	10 58 27	+0. 13	4, 4	4	26	360r, Blk.	Bn.	
5	-- -- --	-----	11 18 39	−1. 09	0, 4	4	26	360r, Blk.	Bn.	Too poor to finish. Moonlight.
6	10 18 27	+19. 89	10 24 11	−0. 94	4, 4	2–3	26	360r, Blk.	Bn.	
6	-- -- --	-----	10 31 20	−0. 80	0, 4	2–3	26	360r, Blk.	Bn.	Stopped by haze.
15	12 6 36	−19. 65	12 16 20	+0. 30	4, 4	3	26	360r, Blk.	Bn.	Too ft. to finish.
		$\Delta\alpha \cos \delta$		$\Delta\delta$						
1922		"		"						
May 29	14 23 23	+23. 06	14 40 2	−12. 56	4, 4	3	26	360r, Blk.	Hl.	
29	15 8 32	+18. 86	14 48 33	−12. 38	4, 4	3	26	360r, Blk.	Hl.	
30	12 41 9	+19. 06	12 59 40	−11. 85	4, 4	3	26	360r, Blk.	Hl.	Clouds. Haze.
30	-- -- --	-----	13 15 8	−16. 37	0, 4	3	26	360r, Blk.	Hl.	Clouds. Haze. Sat. went out.

SATELLITES OF MARS

PHOBOS—MARS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1922	h m s	°	h m s	"			in.			
June 3	13 7 28	300. 24	13 41 26	25. 57	2, 2	3	26	360r, Blk.	Hl.	Sat. went out.
7	12 48 40	120. 04	13 15 44	24. 23	2, 2	3	26	360r, Blk.	Hl.	Sat. went out. Clds. Haze.
12	11 31 17	301. 99	11 33 41	27. 91	4, 4	4	26	360r, Blk.	Hl.	
15	11 33 2	119. 75	12 11 25	27. 03	2, 3	3	26	360r, Blk.	Hl.	Ft. Foggy. Stopped by clds.
July 6	9 14 44	304. 61	9 44 40	26. 86	2, 1	3–4	26	360r, Blk.	Hl.	V. ft. Moonlight. Haze. Too close to planet to finish.
1924										
July 19	12 16 3	239. 37	12 16 3	22. 49	2, 4	3	26	360r, Blk.	Hl.	Sat. went out.
23	14 49 40	255. 12	14 49 40	30. 16	2, 3	3	26	360r, Red.	Hl.	Too poor to finish.
25	13 04 27	250. 70	13 04 27	29. 78	4, 5	4	26	360r, Blk.	B.	
25	13 25 59	244. 58	13 25 59	27. 21	4, 4	4	26	360r, Blk.	B.	
26	12 36 22	241. 15	-- -- --	-----	2, 0	4	26	360r, Blk.	B.	Sat. went out.
26	15 34 55	75. 42	15 34 55	29. 69	5, 4	4	26	360r, Blk.	Hl.	
27	14 23 51	77. 01	14 23 51	30. 51	4, 4	2	26	360r, Blk.	Hl.	Haze.
28	12 49 50	86. 25	12 49 50	26. 89	4, 4	2	26	360r, Blk.	Hl.	Driving clock running slow.
28	13 22 19	77. 12	13 22 19	30. 92	4, 4	2	26	360r, Blk.	Hl.	
29	12 29 34	73. 60	12 29 34	30. 40	4, 5	4	26	360r, Blk.	B.	Haze. Half the time not visible.
29	13 04 04	63. 53	13 04 04	27. 43	2, 4	4	26	360r, Blk.	Hl.	Too ft. to finish.
Aug. 1	12 34 40	265. 92	12 34 40	29. 21	4, 4	3	26	360r, Blk.	Hl.	Delayed by clds.
4	10 54 06	242. 21	10 54 06	26. 23	5, 4	3	26	360r, Blk.	B.	
4	12 55 01	91. 30	12 55 01	24. 00	4, 4	3	26	360r, Blk.	B.	
4	13 13 33	84. 16	13 13 33	28. 00	4, 4	3	26	360r, Blk.	B.	
4	13 41 26	76. 68	13 41 26	31. 49	4, 4	3	26	360r, Blk.	B.	
4	14 17 18	67. 28	14 17 18	30. 32	4, 4	3	26	360r, Blk.	B.	
4	14 35 47	61. 67	14 35 47	26. 94	4, 4	3	26	360r, Blk.	B.	
5	12 36 22	77. 56	12 36 22	31. 69	4, 4	2	26	360r, Red.	B.	Delayed by clds. Ft. at times.
5	13 06 54	69. 43	13 06 54	31. 07	4, 4	2	26	360r, Blk.	B.	
5	13 22 10	65. 02	13 22 10	29. 14	4, 4	2	26	360r, Red.	B.	
5	13 41 48	57. 48	13 41 48	24. 90	4, 4	2	26	360r, Blk.	B.	Ft. at last.
6	11 0 23	87. 18	11 0 23	26. 83	4, 4	3	26	360r, Blk.	B.	
6	11 25 55	79. 37	11 25 55	31. 24	4, 4	3	26	360r, Blk.	B.	
6	11 49 31	73. 96	11 49 31	32. 25	4, 4	3	26	360r, Blk.	B.	
6	12 10 41	67. 39	12 10 41	30. 56	4, 4	3	26	360r, Red.	B.	
6	12 28 42	61. 24	12 28 42	27. 45	4, 5	3	26	360r, Blk.	B.	Delayed by clds.
6	12 44 35	54. 75	12 44 35	23. 72	5, 5	3	26	360r, Blk.	B.	
6	14 50 56	270. 98	14 50 56	27. 60	4, 4	3	26	360r, Blk.	B.	
6	15 4 13	266. 28	15 04 13	30. 18	4, 4	3	26	360r, Blk.	B.	Haze after this.
8	12 42 53	271. 16	12 42 53	26. 90	4, 4	3	26	360r, Blk.	Hl.	
8	13 20 20	259. 39	13 20 20	32. 94	4, 4	3	26	360r, Blk.	Hl.	
14	10 26 51	85. 95	10 26 51	29. 82	4, 4	4	26	360r, Blk.	Hl.	
14	10 58 34	78. 41	10 58 34	33. 37	4, 4	4	26	360r, Blk.	Hl.	
14	14 12 17	269. 26	14 12 17	29. 51	4, 4	4	26	360r, Blk.	Hl.	
15	10 53 12	61. 26	10 53 12	26. 76	4, 4	3	26	360r, Blk.	Hl.	
15	12 46 38	279. 68	12 46 38	23. 10	4, 4	3	26	360r, Blk.	Hl.	
15	13 18 38	266. 54	13 18 38	31. 10	4, 4	3	26	360r, Blk.	Hl.	
17	15 00 26	85. 09	15 00 26	30. 52	4, 4	3	26	360r, Blk.	Hl.	
18	11 05 54	252. 80	11 05 54	33. 35	4, 4	3	26	360r, Blk.	Hl.	
18	11 38 4	244. 09	11 38 4	26. 90	4, 4	4	26	360r, Blk.	Hl.	
19	13 04 54	83. 46	13 4 54	31. 88	4, 4	3	26	360r, Blk.	Hl.	
19	13 38 25	74. 83	13 38 25	34. 09	4, 4	4	26	360r, Blk.	Hl.	
20	12 11 24	80. 98	12 11 24	33. 23	4, 4	3	26	360r, Blk.	Hl.	
21	11 27 16	76. 07	11 27 16	34. 30	4, 4	3	26	360r, Red.	Hl.	Delayed by clds.
23	12 07 55	280. 02	12 07 55	24. 14	4, 4	2	26	360r, Blk.	B.	Delayed by clds.
23	12 27 24	271. 64	12 27 24	29. 57	2, 3	3	26	360r, Blk.	B.	Stopped by clds.
26	10 09 32	258. 10	10 09 32	34. 42	4, 4	3	26	360r, Blk.	Hl.	
26	10 51 31	246. 17	10 51 31	28. 03	4, 4	3	26	360r, Blk.	Hl.	
26	13 58 27	75. 31	13 58 27	34. 19	5, 4	3	26	360r, Blk.	B.	

SATELLITES OF MARS

PHOBOS—MARS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1924	h m s	°	h m s	''			in.			
Aug. 26	14 9 52	72. 59	14 9 52	33. 32	4, 4	3	26	360r, Blk.	B.	
27	12 22 27	84. 98	12 22 27	32. 34	4, 4	4	26	360r, Blk.	Hl.	
28	11 22 54	84. 24	11 22 54	32. 05	4, 4	3	26	360r, Blk.	Hl.	
28	12 20 2	69. 78	12 20 2	31. 16	2, 4	3–4	26	360r, Blk.	Hl.	Sat. went out.
29	10 45 6	78. 02	10 45 6	33. 97	4, 4	2	26	360r, Blk.	Hl.	
29	11 26 13	67. 19	11 26 13	29. 12	4, 4	2	26	360r, Blk.	Hl.	
29	14 3 15	267. 66	14 3 15	31. 72	4, 4	2	26	360r, Blk.	Hl.	
30	10 35 37	63. 02	10 35 37	25. 98	4, 4	3	26	360r, Blk.	Hl.	
30	12 35 44	276. 42	12 35 44	25. 35	4, 4	3	26	360r, Blk.	Hl.	
30	13 05 11	266. 44	13 05 11	31. 94	4, 4	3–4	26	360r, Blk.	Hl.	
Sept. 4	11 27 1	89. 41	11 27 1	28. 56	4, 4	3	26	360r, Blk.	Hl.	After this seeing too poor for obsn.
10	10 17 16	253. 42	10 17 16	29. 83	2, 4	4	26	360r, Blk.	Hl.	
24	9 52 8	271. 80	9 52 8	25. 86	4, 4	3	26	360r, Blk.	Hl.	
24	10 20 56	263. 83	10 20 56	28. 89	4, 4	4	26	360r, Blk.	Hl.	
1926										
Oct. 4	13 32 6	46. 90	13 36 44	24. 18	4, 5	2	26	360r, Blk.	Hl.	Micrometer Clark II.
9	11 35 51	232. 80	11 39 52	26. 67	4, 4	2	26	360r, Blk.	Hl.	Delayed by haze. Clark II.
20	11 56 45	47. 99	11 57 53	27. 33	4, 4	3–4	26	360r, Blk.	Hl.	Repsold micrometer beginning this date.
21	10 24 37	53. 89	10 24 58	27. 45	4, 4	2	26	360r, Blk.	Hl.	
21	11 2 53	47. 30	11 4 38	26. 59	4, 4	2	26	360r, Blk.	Hl.	
28	10 49 4	52. 52	10 50 3	27. 98	4, 4	3–4	26	360r, Blk.	Hl.	
Nov. 1	11 3 0	225. 60	11 2 37	26. 03	4, 4	2	26	360r, Blk.	Hl.	
3	9 17 43	220. 61	9 33 19	18. 73	2, 4	3–4	26	360r, Blk.	Hl.	Sat. went out.
3	11 42 38	60. 58	11 43 19	24. 48	4, 4	3	26	360r, Blk.	Hl.	
5	9 38 2	60. 12	9 40 38	24. 84	4, 4	3–4	26	360r, Blk.	Hl.	
6	8 59 56	54. 03	9 0 46	27. 34	4, 4	3	26	360r, Blk.	Hl.	
6	12 56 50	232. 60	12 59 00	26. 37	4, 4	2	26	360r, Blk.	Hl.	
10	8 58 59	230. 52	8 58 52	26. 49	4, 4	4	26	360r, Blk.	Hl.	Delayed by clds.
23	10 50 22	228. 31	10 50 57	22. 60	4, 4	3	26	360r, Blk.	Hl.	
Dec. 2	8 50 53	232. 52	8 56 39	23. 01	4, 5	3	26	360r, Blk.	Hl.	V. ft, haze.
		$\Delta\alpha \cos \delta$		$\Delta\delta$						
1926		''		''						
Oct. 4	12 42 16	+20. 79	12 43 11	+15. 09	4, 4	2	26	360r, Blk.	Bn.	Micrometer Clark II.
14	-- -- --	-----	10 46 59	+17. 87	0, 4	3–4	26	360r, Blk.	Bn.	Too unsteady to finish. Clark II.
20	11 5 28	+21. 21	11 14 11	+14. 97	4, 4	3–4	26	360r, Blk.	Bn.	Repsold micrometer beginning this date.
20	11 24 16	+22. 05	11 18 45	+15. 90	4, 4	3–4	26	360r, Blk.	Bn.	
21	11 51 12	+ 8. 86	11 41 53	+15. 50	4, 4	2	26	360r, Blk.	Bn.	
21	11 58 3	+ 7. 29	-- -- --	-----	4, 0	2	26	360r, Blk.	Bn.	Too close to planet for $\Delta\delta$.
26	12 13 40	+20. 35	12 21 33	+12. 46	4, 4	4	26	360r, Blk.	Bn.	
26	12 32 21	+21. 78	12 26 14	+13. 49	4, 4	4	26	360r, Blk.	Bn.	
26	13 29 3	+19. 98	13 37 43	+18. 58	4, 4	4	26	360r, Blk.	Bn.	
26	13 53 39	+15. 24	13 44 38	+18. 22	4, 4	4	26	360r, Blk.	Bn.	
28	11 31 43	+17. 92	11 38 14	+18. 05	4, 4	4	26	360r, Blk.	Bn.	
28	11 55 27	+12. 36	11 48 24	+17. 70	4, 4	4	26	360r, Blk.	Bn.	
Nov. 2	10 9 0	−16. 94	10 16 4	−17. 67	4, 4	4	26	360r, Blk.	Bn.	
2	10 28 29	−12. 95	10 21 52	−17. 25	4, 4	3	26	360r, Blk.	Bn.	
5	10 1 22	+22. 15	10 8 15	+16. 85	4, 4	4	26	360r, Blk.	Bn.	
5	10 21 50	+21. 41	10 13 39	+17. 55	4, 4	4	26	360r, Blk.	Bn.	
6	9 27 3	+20. 54	9 33 45	+18. 52	4, 4	2	26	360r, Blk.	Bn.	
6	9 47 12	+17. 74	9 39 42	+18. 45	4, 4	3	26	360r, Blk.	Bn.	
11	8 12 19	−18. 54	8 20 32	−17. 45	4, 4	3	26	360r, Blk.	Bn.	
11	8 32 10	−14. 70	8 26 8	−17. 48	4, 4	3	26	360r, Blk.	Bn.	
22	11 21 35	−19. 47	11 28 56	−13. 87	4, 4	3	26	360r, Blk.	Bn.	
22	11 43 52	−18. 74	11 35 6	−14. 63	4, 4	3	26	360r, Blk.	Bn.	Haze.
23	9 53 47	−18. 02	10 2 8	−10. 31	4, 4	3	26	360r, Blk.	Bn.	
23	10 16 48	−19. 11	10 9 32	−11. 53	4, 4	3	26	360r, Blk.	Bn.	
30	10 56 52	−17. 58	11 8 32	−14. 30	4, 4	4–3	26	360r, Blk.	Bn.	
30	11 26 49	−14. 34	11 16 26	−14. 74	4, 4	3	26	360r, Blk.	Bn.	
Dec. 10	8 21 26	−15. 15	8 34 40	−13. 07	4, 4	3	26	360r, Blk.	Bn.	V. ft., measures rough, haze.
10	-- -- --	-----	8 55 3	−13. 63	0, 4	3	26	360r, Blk.	Bn.	V. ft., measures rough, haze.

SATELLITES OF MARS

DEIMOS—MARS

Date	W. M. T.	$\Delta\alpha \cos\delta$	W. M. T.	$\Delta\delta$	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1909	h m s	"	h m s	"			in.			
Aug. 23	14 6 27	+65. 04	14 20 48	+37. 88	4, 4	3	26	360r, Red.	Hl.	
23	14 45 59	+63. 21	14 30 45	+38. 26	4, 4	3	26	360r, Red.	Hl.	
25	13 30 4	−60. 41	13 43 2	−43. 68	4, 4	3	26	360r, Red.	Hl.	V. ft.
25	14 31 41	−51. 62	13 57 20	−44. 39	4, 4	3	26	360r, Red.	Hl.	
26	14 48 9	−54. 62	14 59 58	−15. 56	4, 4	3	26	360r, Blk.	Hl.	
26	15 27 50	−60. 44	15 16 46	−18. 59	2, 4	3	26	360r, Blk.	Hl.	Sat. too ft. to finish.
Sept. 7	12 5 32	+33. 62	12 21 34	− 6. 26	4, 4	2	26	360r, Blk.	Hl.	
7	12 41 8	+40. 47	12 30 57	− 4. 88	4, 4	2	26	360r, Blk.	Hl.	
10	11 56 30	+22. 00	12 11 11	+38. 92	4, 4	2	26	360r, Red.	Hl.	
10	12 43 28	+10. 33	12 21 3	+37. 71	4, 4	2	26	360r, Red.	Hl.	
10	13 57 58	− 7. 56	14 16 46	+23. 83	4, 4	3	26	360r, Red.	Hl.	Eyes tired.
10	14 47 25	−19. 93	14 40 6	+20. 46	4, 4	3	26	360r, Red.	Ep.	
10	14 55 12	−22. 06	15 1 51	+16. 97	4, 4	3	26	360r, Red.	Ep.	
12	11 20 50	+ 7. 70	11 0 36	−29. 05	4, 4	2–3	26	360, Red.	Hl.	Sat. went out.
12	13 36 24	+39. 50	13 12 4	− 9. 89	4, 4	2–3	26	360r, Red.	Hl.	
12	14 15 56	+47. 59	14 39 21	+ 4. 95	4, 4	2–3	26	360r, Red.	Hl.	Clds. and fog.
13	10 14 48	−72. 25	10 26 16	−42. 02	4, 4	2–3	26	360r, Red.	Hl.	Haze.
13	10 48 37	−70. 49	10 36 42	−42. 86	4, 4	2–3	26	360r, Red.	Hl.	
14	11 10 30	−41. 74	11 20 8	+ 2. 64	4, 4	2–3	26	360r, Red.	Hl.	
14	11 44 17	−48. 39	11 28 14	+ 0. 70	4, 4	2–3	26	360r, Red.	Hl.	
14	13 6 10	−61. 84	13 22 37	−17. 60	4, 4	2–3	26	360r, Red.	Hl.	Stopped by fog.
17	10 45 51	−17. 64	10 56 26	−37. 80	4, 4	3	26	360r, Blk.	Hl.	
17	11 15 15	−10. 14	11 5 20	−36. 68	4, 4	3	26	360r, Blk.	Hl.	
18	10 39 24	−73. 56	10 53 53	−37. 74	4, 4	3	26	360r, Blk.	Hl.	
18	11 20 52	−72. 80	11 10 36	−39. 40	4, 4	3	26	360r, Blk.	Hl.	
18	14 12 38	−54. 40	14 24 50	−47. 90	4, 4	3–4	26	360r, Brt.	Hl.	
18	14 41 26	−48. 89	14 32 54	−47. 60	4, 4	3–4	26	360r, Brt.	Hl.	
21	10 48 57	+55. 17	10 59 59	+ 8. 21	4, 4	3	26	360r, Blk.	Hl.	Ft. Haze.
21	11 27 15	+61. 31	11 13 55	+10. 12	4, 4	3	26	360r, Blk.	Hl.	Ft. Haze.
22	10 30 13	−36. 09	10 38 57	−44. 27	4, 4	2	26	360r, Blk.	Hl.	
22	11 16 14	−25. 95	11 2 7	−42. 78	4, 4	2	26	360r, Blk.	Hl.	
22	12 14 45	−11. 41	12 25 44	−35. 28	4, 4	2	26	360r, Blk.	Hl.	
22	12 49 29	− 2. 75	12 34 48	−34. 31	4, 4	2	26	360r, Blk.	Hl.	
24	11 35 17	−17. 68	11 50 8	+19. 33	4, 4	5	26	360r, Blk.	Ep.	
24	12 18 52	−28. 03	12 4 56	+16. 88	4, 4	5	26	360r, Blk.	Ep.	
24	13 55 51	−49. 17	14 18 50	− 3. 35	4, 4	4	26	360r, Blk.	Hl.	
24	15 1 32	−60. 53	14 40 55	− 7. 13	4, 4	4	26	360r, Blk.	Hl.	
25	14 9 9	+36. 79	-- -- --	-----	4, 0	3–4	26	360r, Blk.	Hl.	
30	9 49 43	+72. 73	10 6 39	+32. 82	4, 4	3	26	360r, Blk.	Hl.	
30	10 33 42	+72. 57	10 20 19	+34. 89	4, 4	3	26	360r, Blk.	Hl.	
30	11 44 50	+68. 83	11 56 26	+42. 32	4, 4	3	26	360r, Blk.	Hl.	
30	12 16 14	+65. 91	12 5 17	+43. 02	4, 4	3	26	360r, Blk.	Hl.	
Oct. 2	12 2 36	−42. 91	12 38 57	−42. 64	2, 4	3	26	360r, Blk.	Hl.	Clouded.
4	8 53 39	+49. 15	9 20 26	+44. 31	4, 4	2	26	360r, Blk.	Hl.	
4	9 56 20	+36. 58	9 39 13	+43. 92	4, 4	2	26	360r, Blk.	Hl.	
4	12 10 14	+ 5. 86	12 31 40	+31. 22	4, 4	2	26	360r, Blk.	Hl.	
4	-- -- --	-----	12 56 5	+28. 37	0, 4	2	26	360r, Blk.	Hl.	Sat. went out. Fog.
5	8 50 51	+62. 04	9 11 48	+16. 04	4, 4	2	26	360r, Blk.	Hl.	Haze.
5	9 41 37	+66. 86	9 25 19	+18. 07	4, 4	2	26	360r, Blk.	Hl.	Haze.
7	8 47 17	−69. 74	8 59 21	−32. 69	4, 4	3	26	360r, Blk.	Hl.	V. ft.
7	9 24 3	−69. 18	9 10 53	−33. 80	4, 4	3	26	360r, Blk.	Hl.	V. ft.
8	9 47 22	−33. 37	9 57 45	+10. 58	4, 4	2	26	360r, Blk.	Hl.	
8	10 19 41	−39. 83	10 7 49	+ 9. 28	4, 4	2	26	360r, Blk.	Hl.	
9	8 12 31	+62. 35	8 24 33	+41. 15	4, 4	2	26	360r, Blk.	Hl.	
9	8 48 41	+58. 17	8 37 46	+41. 71	4, 4	2	26	360r, Blk.	Hl.	
9	11 14 30	+33. 41	11 29 53	+40. 59	4, 4	2–3	26	360r, Blk.	Hl.	
9	12 7 41	+21. 59	11 46 19	+39. 95	4, 4	2–3	26	360r, Blk.	Hl.	

SATELLITES OF MARS

DEIMOS—MARS—Continued

Date	W. M. T.	$\Delta\alpha$	W. M. T.	Δd	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1911	h m s	''	h m s	''			in.			
Nov. 3	12 5 55	+61. 06	11 40 42	−0. 11	3, 4	3	26	388s, Blk.	Hl.	V. ft.
10	10 16 55	−62. 69	9 54 46	−0. 42	4, 4	3–4	26	388s, Blk.	Hl.	V. ft. Red wires in Δa.
10	10 28 59	−63. 29	10 50 35	−0. 53	4, 4	3–4	26	388s, Blk.	Hl.	Object glass fogged.
16	14 2 23	−48. 02	14 20 51	+3. 86	4, 4	3	26	388s, Blk.	Hl.	V. ft.
16	14 43 2	−53. 44	14 27 24	+3. 78	5, 5	3	26	388s, Blk.	Hl.	Sat. finally went out.
19	9 29 0	−47. 66	9 9 47	−4. 76	4, 4	3	26	360r, Blk.	Hl.	V. ft. Rough obsn.
19	9 43 59	−46. 24	10 1 1	−5. 44	4, 4	3	26	360r, Blk.	Hl.	V. ft.
21	14 4 53	−38. 15	14 23 25	+5. 49	4, 4	2–3	26	360r, Blk.	Hl.	V. ft. Rough obsn.
21	14 52 31	−45. 81	14 38 46	+5. 13	4, 4	2–3	26	360r, Blk.	Hl.	V. ft.
22	8 57 34	+62. 31	9 16 28	−0. 58	4, 4	2	26	388s, Red.	Hl.	
22	9 38 18	+62. 96	9 23 52	−0. 40	4, 4	2	26	388s, Red.	Hl.	
26	9 0 40	+36. 37	-- -- --	-----	4, 0	3–4	26	388s, Blk.	Hl.	Sat. too ft. to finish.
Dec. 6	8 20 34	+55. 23	7 56 48	+3. 05	4, 4	2	26	388s, Red.	Hl.	V. ft. Bright moonlight.
6	8 30 11	+54. 33	8 48 25	+4. 51	4, 4	2	26	388s, Red.	Hl.	Haze.
7	12 19 28	+58. 04	12 32 11	−0. 08	4, 4	2	26	388s, Red.	Hl.	V. ft.
7	12 53 41	+58. 63	12 40 47	+0. 16	4, 4	2	26	388s, Red.	Hl.	
10	13 48 32	−48. 11	14 16 38	+3. 96	4, 2	3	26	388s, Red.	Hl.	
19	9 31 34	−43. 01	-- -- --	-----	4, 0	2–3	26	388s, Red.	Hl.	V. ft.
1913										
Dec. 27	10 14 56	−27. 37	-- -- --	-----	4, 0	2	26	360r, Blk.	Bn.	V. ft. Unsatisfactory.
29	14 5 43	−36. 84	14 13 34	−3. 42	4, 4	2–3	26	360r, Blk.	Bn.	
29	14 36 8	−41. 42	14 21 0	−3. 80	4, 4	2–3	26	360r, Blk.	Bn.	
30	12 8 16	+41. 80	12 18 58	−6. 19	4, 4	2–3	26	360r, Red.	Bn.	V. ft. Perhaps haze.
30	12 32 48	+38. 68	12 26 6	−6. 31	4, 4	2–3	26	360r, Red.	Bn.	Possibly not Deimos in Δd.
1914										
Jan. 5	15 2 55	+49. 79	15 14 0	+0. 56	4, 4	3	26	360r, Blk.	Bn.	V. ft. Object glass slightly
5	15 35 50	+51. 50	15 23 40	+0. 62	4, 4	3	26	360r, Blk.	Bn.	fogged.
7	12 11 42	−49. 03	12 19 48	−0. 25	4, 4	2	26	360r, Blk.	Bn.	Ft. Moonlight and haze.
9	12 35 4	+48. 80	12 41 11	−2. 30	4, 4	4	26	360r, Red.	Bn.	V. ft. Moonlight. Windy.
9	13 10 34	+46. 98	12 55 56	−4. 22	4, 4	4	26	360r, Red.	Bn.	
21	9 36 29	−46. 71	-- -- --	-----	4, 0	3	26	360r, Blk.	Bn.	Clouds. Windy. Sat. went out.
1916										
Feb. 3	11 37 12	+46. 39	11 57 19	+0. 22	2, 2	3	26	360r, Red.	Hl.	V. ft.
		$\Delta\alpha \cos\delta$		$\Delta\delta$						
1922		''		''						
May 22	12 25 44	−56. 28	13 11 48	+27. 60	4, 4	3	26	360r, Red.	Hl.	Ft.
29	11 55 3	+57. 16	12 11 48	−31. 75	4, 4	3	26	360r, Red.	Hl.	
29	12 44 22	+53. 00	12 26 46	−33. 30	4, 4	3	26	360r, Red.	Hl.	
		p		s						
		°		''						
June 3	12 5 20	118. 23	12 4 17	67. 63	4, 4	3	26	360r, Red.	Hl.	
15	10 19 43	298. 97	10 21 32	70. 27	4, 4	3	26	360r, Red.	Hl.	
25	10 48 54	296. 13	11 48 23	67. 31	2, 1	3	26	360r, Red.	Hl.	V. ft. Haze. Sat. too ft. to finish.
29	10 20 14	304. 80	10 49 3	63. 12	2, 1	3	26	360r, Red.	Hl.	Sat. too ft. to finish.
1924										
July 16	14 35 29	77. 23	14 35 29	70. 27	6, 6	4	26	360r, Red.	B.	
19	13 21 23	285. 63	-- -- --	-----	3, 0	3	26	360r, Blk.	B.	Clouded.
23	14 2 40	253. 96	14 2 40	75. 12	5, 4	3	26	360r, Red.	Hl.	At first Deimos near faint star.
25	13 49 43	64. 94	13 49 43	64. 42	6, 6	4	26	360r, Red.	B.	
25	14 22 44	61. 68	14 22 44	59. 43	5, 5	3	26	360r, Red.	B.	

1757—29——7

SATELLITES OF MARS

DEIMOS—MARS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1924	h m s	°	h m s	″			in.			
July 26	14 34 39	86. 01	14 34 39	65. 30	7, 6	4	26	360r, Red.	B.	
27	12 25 35	238. 67	12 25 35	55. 11	4, 4	2	26	360r, Red.	Hl.	Haze.
28	11 48 51	267. 00	11 48 51	67. 08	4, 4	2	26	360r, Red.	Hl.	Haze.
Aug. 4	11 27 39	82. 22	11 27 39	75. 97	4, 4	3	26	360r, Red.	B.	Delayed by clouds.
4	12 4 59	79. 72	12 4 59	79. 11	4, 4	3	26	360r, Red.	B.	
4	12 29 7	78. 64	12 29 7	80. 17	4, 4	2	26	360r, Red.	B.	
4	15 11 18	69. 14	15 11 18	75. 73	4, 4	3	26	360r, Red.	B.	
5	14 38 22	100. 58	14 38 22	46. 47	2, 3	2	26	360r, Red.	B.	Stopped by clouds.
6	10 28 54	257. 61	10 28 54	83. 77	4, 4	3	26	360r, Red.	B.	
6	13 19 30	247. 25	13 19 30	72. 48	4, 6	2	26	360r, Red.	B.	
6	13 47 18	245. 27	13 47 18	68. 35	4, 4	2	26	360r, Red.	B.	
6	14 8 32	243. 48	14 8 32	64. 68	4, 4	2	26	360r, Red.	B.	
6	14 28 12	241. 46	14 28 12	61. 18	4, 5	2	26	360r, Red.	B.	
8	12 0 36	59. 55	12 0 36	59. 66	4, 4	3	26	360r, Blk.	Hl.	Haze. Deimos ft.
14	11 39 48	92. 79	11 39 48	61. 52	4, 4	3	26	360r, Blk.	Hl.	
14	12 14 1	89. 60	12 14 1	67. 94	4, 5	3	26	360r, Blk.	Hl.	
14	13 3 24	85. 84	13 03 24	75. 27	4, 4	4	26	360r, Blk.	Hl.	
15	11 29 49	234. 55	11 29 49	49. 65	4, 4	3	26	360r, Blk.	Hl.	
15	12 5 26	227. 97	12 05 26	42. 08	5, 4	3	26	360r, Blk.	Hl.	Faint for last three p's.
17	13 22 41	293. 16	13 22 41	38. 45	4, 4	3	26	360r, Blk.	Hl.	
17	14 13 9	282. 11	14 13 9	49. 22	4, 4	4	26	360r, Blk.	Hl.	
18	12 31 28	70. 51	12 31 28	78. 21	4, 4	4	26	360r, Red.	Hl.	
18	13 8 8	67. 54	13 8 8	73. 01	4, 5	4	26	360r, Red.	Hl.	
19	11 43 52	100. 96	11 43 52	49. 20	4, 4	3	26	360r, Blk.	Hl.	Deimos ft.
19	12 21 12	95. 97	12 21 12	57. 13	4, 5	3	26	360r, Blk.	Hl.	Deimos ft.
20	13 9 59	228. 74	13 9 59	42. 21	4, 4	3	26	360r, Blk.	Hl.	
21	13 13 11	260. 76	13 13 11	86. 30	4, 5	3	26	360r, Red.	Hl.	
21	14 18 30	257. 53	14 18 30	86. 98	4, 4	2	26	360r, Red.	Hl.	
23	11 41 52	77. 26	11 41 52	86. 02	4, 4	2	26	360r, Red.	B.	Delayed by clds.
26	11 46 22	271. 35	11 46 22	69. 09	4, 4	3–4	26	360r, Red.	Hl.	
26	12 34 25	267. 71	12 34 25	76. 63	4, 5	3	26	360r, Red.	Hl.	
26	14 45 49	260. 49	14 45 49	86. 48	4, 5	3	26	360r, Red.	B.	
26	15 8 28	259. 16	15 8 28	86. 47	4, 4	4	26	360r, Red.	B.	
28	10 27 41	85. 63	10 27 41	78. 70	4, 4	3	26	360r, Red.	Hl.	
28	13 35 23	75. 58	13 35 23	83. 58	5, 4	4	26	360r, Red.	Hl.	
29	12 24 26	124. 55	12 24 26	30. 63	4, 4	2	26	360r, Blk.	Hl.	
29	13 16 1	108. 98	13 16 1	41. 03	4, 4	2	26	360r, Blk.	Hl.	
29	14 53 3	94. 82	14 53 3	61. 15	3, 4	3	26	360r.	Hl.	Blk. wires for p, red for s. Mars went behind trees.
30	11 8 58	256. 28	11 8 58	83. 42	4, 4	3	26	360r, Red.	Hl.	
30	11 48 16	253. 61	11 48 16	79. 32	4, 4	3	26	360r. Red.	Hl.	
Sept. 4	10 14 27	262. 77	10 14 27	83. 60	4, 4	2	26	360r, Red.	Hl.	
9	12 8 19	261. 29	12 8 19	82. 05	3, 4	4	26	360r, Red.	Hl.	
23	9 22 52	261. 56	9 22 52	73. 33	4, 5	4	26	360r, Red.	Hl.	
23	10 19 55	258. 21	10 19 55	71. 35	4, 4	4	26	360r, Red.	Hl.	
1926										
Oct. 21	14 42 43	68. 18	14 42 13	50. 53	4, 4	2	26	360r, Blk.	Hl.	Ft.
25	10 7 13	64. 35	10 8 39	55. 84	4, 4	3–4	26	360r, Blk.	Hl.	Ft.
25	11 12 30	60. 29	10 54 41	60. 80	5, 4	3–4	26	360r, Blk.	Hl.	Delayed by clds.
27	10 17 58	235. 48	10 23 53	70. 21	4, 4	3	26	360r, Red.	Hl.	
27	10 57 23	233. 11	10 58 12	70. 50	4, 4	3	26	360r, Red.	Hl.	
28	12 44 38	251. 66	12 47 43	47. 18	4, 4	3–4	26	360r, Blk.	Hl.	
28	14 31 47	242. 17	14 33 14	61. 83	4, 4	3	26	360r, Blk.	Hl.	
Nov. 1	10 7 37	239. 52	10 8 0	65. 72	4, 4	2	26	360r, Blk.	Hl.	Haze.
3	10 25 52	49. 96	10 26 25	67. 03	4, 4	3	26	360r, Blk.	Hl.	Ft.
3	12 59 7	38. 42	12 59 50	51. 56	4, 4	3	26	360r, Blk.	Hl.	

SATELLITES OF MARS

DEIMOS—MARS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1926	h m s	°	h m s	″			in.			
Nov. 5	8 58 3	225. 41	8 58 50	61. 77	4, 4	3–4	26	360r, Red.	Hl.	
5	11 36 12	209. 01	11 35 26	39. 12	4, 4	3	26	360r, Blk.	Hl.	
6	10 16 4	243. 26	10 18 10	59. 92	4, 4	2	26	360r, Blk.	Hl.	
6	11 36 24	238. 02	11 36 33	66. 58	4, 5	3	26	360r, Red.	Hl.	
10	13 9 18	201. 57	13 8 40	33. 54	4, 4	3–4	26	360r, Blk.	Hl.	
11	9 23 33	256. 19	9 23 8	42. 12	4, 5	2–3	26	360r, Blk.	Hl.	Ft.
12	8 18 10	40. 91	8 19 39	53. 71	4, 4	2	26	360r, Red.	Hl.	
12	9 29 25	32. 28	9 31 40	43. 26	4, 4	2	26	360r, Red.	Hl.	
12	11 19 21	8. 09	11 20 20	26. 27	4, 4	2	26	360r, Red.	Hl.	
22	7 30 32	52. 64	7 32 38	61. 89	4, 4	3	26	360r, Red.	Hl.	Ft.
22	8 0 59	50. 94	8 1 53	60. 94	4, 4	3	26	370r, Red.	Hl.	Ft.
23	8 59 35	78. 31	8 57 54	39. 02	6, 5	2	26	360r, Red.	Hl.	V. ft.
30	12 23 30	233. 16	12 25 25	57. 42	4, 4	3	26	360r, Red.	Hl.	V. ft.
		Δα cosδ		Δδ						
1926		″		″						
Oct. 4	14 47 27	−47. 66	14 46 41	−24. 59	4, 4	3	26	360r, Red.	Bn.	Micrometer Clark II.
21	12 27 36	+26. 30	12 36 43	+ 0. 56	4, 4	2	26	360r, Blk.	Bn.	Repsold micrometer beginning
21	12 51 21	+30. 54	12 42 30	+ 1. 85	4, 4	2	26	360r, Blk.	Bn.	this date.
27	11 49 21	−53. 31	11 58 19	−44. 55	4, 4	3	26	360r, Red.	Bn.	
27	12 12 0	−51. 57	12 4 4	−44. 29	4, 4	3	26	360r, Red.	Bn.	
28	13 27 35	−49. 22	13 34 23	−21. 82	4, 4	3	26	360r, Blk.	Bn.	
28	13 50 54	−51. 27	13 43 28	−22. 66	4, 4	3	26	360r, Blk.	Bn.	
Nov. 1	11 35 9	−57. 03	11 43 50	−40. 88	4, 4	3	26	360r, Blk.	Bn.	
1	11 58 12	−56. 06	11 50 32	−41. 57	4, 4	3	26	360r, Blk.	Bn.	
3	10 55 10	+48. 63	11 2 43	+44. 10	4, 4	3	26	360r, Red.	Bn.	
3	11 17 56	+46. 24	11 9 29	+44. 16	4, 4	3	26	360r, Red.	Bn.	
5	10 33 9	−29. 84	10 41 28	−38. 83	4, 4	4	26	360r, Blk.	Bn.	
5	10 55 52	−26. 12	10 47 42	−38. 18	4, 4	4	26	360r, Blk.	Bn.	
6	10 41 38	−55. 19	10 48 23	−30. 47	4, 4	2	26	360r, Red.	Bn.	
6	11 1 23	−56. 04	10 54 4	−31. 15	4, 4	2	26	360r, Red.	Bn.	
10	12 3 19	−24. 31	12 13 10	−36. 39	4, 4	4	26	360r, Blk.	Bn.	
10	12 29 59	−19. 47	12 20 12	−35. 78	4, 4	4–3	26	360r, Blk.	Bn.	
11	10 39 54	−49. 35	10 48 0	−21. 80	4, 4	3	26	360r, Red.	Bn.	
11	11 2 52	−51. 70	10 53 52	−22. 72	4, 4	3	26	360r, Red.	Bn.	
12	8 43 46	+31. 43	8 50 43	+39. 48	4, 4	2	26	360r, Red.	Bn.	
12	9 2 28	+28. 10	8 55 46	+38. 95	4, 4	2	26	360r, Red.	Bn.	
12	10 9 44	+16. 69	10 16 57	+32. 94	4, 4	2	26	360r, Red.	Bn.	
12	10 37 43	+11. 47	10 27 37	+31. 91	4, 4	2	26	360r, Blk.	Bn.	Thin clds.
17	10 26 9	+23. 87	10 33 8	+36. 31	4, 4	3	26	360r, Red.	Bn.	
17	10 46 56	+20. 33	10 39 12	+36. 01	4, 4	3	26	360r, Red.	Bn.	
Dec. 2	10 50 29	+41. 58	11 0 35	+36. 07	4, 4	2	26	360r, Red.	Bn.	Ft.
2	11 37 42	+37. 34	11 10 53	+36. 17	4, 4	2	26	360r, Red.	Bn.	Haze.

SATELLITE VI OF JUPITER

Date	W. M. T.	Apparent Place of Satellite		Satellite—Star		Comp.	Log pp		App. Pl. Red. of Star	
		α	δ	α	δ		α	δ	α	δ
1909	h m s	h m s	° ′ ″	m s	′ ″				s	″
Apr. 9	10 49 9	10 27 5. 18	+10 52 21. 2	+2 33. 05	− 7 8. 4	t19, 4	9. 264	0. 624	+0. 67	− 2. 6
10	10 31 50	10 26 47. 09	+10 53 18. 4	−2 28. 77	+ 0 52. 3	t20, 4	9. 202	0. 621	+0. 68	− 2. 7
11	9 42 55	10 26 30. 26	+10 54 15. 5	+1 58. 14	− 5 14. 1	t30, 6	8. 851	0. 615	+0. 66	− 2. 6
16	9 42 30	10 25 14. 92	+10 57 59. 5	+0 42. 83	− 1 30. 4	t12, 5	9. 049	0. 616	+0. 63	− 2. 3
22	10 10 41	10 24 11. 20	+11 0 15. 4	−0 20. 81	+ 0 45. 1	t18, 6	9. 327	0. 627	+0. 55	− 1. 9
23	9 26 2	10 24 3. 82	+11 0 23. 8	−0 28. 18	+ 0 53. 5	t18, 6	9. 133	0. 618	+0. 54	− 1. 9
1910										
Apr. 8	11 37 15	12 31 39. 90	− 1 51 19. 5	+0 27. 67	− 0 21. 4	t18, 6	8. 372	0. 757	+1. 10	− 7. 8
10	13 52 13	12 30 53. 96	− 1 45 1. 4	−0 18. 27	+ 5 56. 6	t18, 6	9. 459	0. 753	+1. 10	− 7. 7
13	12 24 53	12 29 51. 88	− 1 36 20. 3	+4 8. 47	− 9 32. 5	t20, 7	9. 200	0. 754	+1. 11	− 7. 6
1911										
Mar. 24	15 4 10	14 49 49. 00	−14 45 43. 3	+2 55. 46	− 7 17. 6	t25, 5	8. 637	0. 848	+0. 94	− 9. 9
31	14 48 30	14 47 21. 96	−14 38 41. 1	+1 11. 76	+ 1 6. 2	t18, 6	8. 861	0. 847	+1. 06	−10. 5
Apr. 24	12 42 40	14 35 8. 36	−13 58 17. 0	−1 29. 31	+ 6 48. 1	t30, 6	8. 518	0. 844	+1. 47	−12. 1
26	13 19 39	14 33 56. 46	−13 53 58. 9	−0 52. 63	−11 33. 4	t30, 6	9. 101	0. 840	+1. 48	−12. 1
June 1	10 10 35	14 14 18. 76	−12 37 36. 1	−2 44. 22	+ 0 59. 4	t29, 6	8. 843	0. 836	+1. 66	−12. 5
1912										
Apr. 23	14 42 17	16 49 13. 82	−21 49 40. 6	−0 38. 95	+ 0 8. 6	t30, 10	7. 310	0. 884	+1. 67	−11. 4
May 13	14 54 29	16 41 30. 21	−21 23 16. 8	−1 31. 86	− 7 33. 9	t30, 10	9. 316	0. 868	+2. 10	−12. 2
17	14 22 3	16 39 44. 29	−21 17 24. 5	−4 3. 87	− 3 48. 7	t30, 10	9. 249	0. 872	+2. 18	−12. 1
20	13 23 50	16 38 24. 25	−21 13 1. 5	−4 37. 98	+ 2 41. 4	t30, 10	8. 926	0. 879	+2. 26	−12. 2
June 8	12 27 4	16 30 4. 93	−20 46 44. 9	−1 1. 77	+ 8 43. 7	t30, 10	9. 142	0. 874	+2. 48	−13. 1
1913										
June 5	14 52 9	19 14 59. 82	−22 51 10. 7	−4 25. 09	+ 0 47. 7	t14, 3	8. 861	0. 886	+2. 82	− 2. 7
9	14 58 32	19 13 10. 69	−22 56 39. 5	−1 24. 11	− 8 30. 4	t30, 6	9. 092	0. 884	+2. 95	− 3. 1
10	14 24 23	19 12 42. 88	−22 57 58. 8	−1 2. 36	+ 2 32. 9	t30, 6	8. 779	0. 887	+2. 98	− 3. 1
30	11 50 43	19 1 12. 39	−23 23 46. 9	−2 20. 04	− 4 3. 1	t29, 6	8. 891$_n$	0. 888	+3. 38	− 3. 2
July 7	13 17 3	18 56 36. 43	−23 31 18. 6	−4 43. 71	− 8 2. 0	t20, 4	9. 246	0. 881	+3. 52	− 3. 4
1914										
Sept. 14	11 4 30	21 7 38. 12	−17 42 38. 3	−2 44. 01	− 0 43. 8	t19, 5	9. 264	0. 855	+4. 11	+11. 3
20	9 51 24	21 6 28. 95	−17 52 7. 6	−2 33. 44	+ 2 53. 2	t18, 4	8. 937	0. 863	+4. 05	+10. 7
22	11 21 42	21 6 9. 31	−17 55 0. 2	−3 4. 35	+ 2 46. 1	t20, 4	9. 441	0. 842	+4. 03	+10. 6
1915										
Oct. 27	9 44 51	23 21 1. 41	− 5 37 59. 9	+0 53. 89	+ 1 33. 2	t15, 5	8. 956	0. 788	+4. 16	+24. 8
28	8 6 20	23 20 43. 74	− 5 38 58. 6	+0 2. 89	+ 1 18. 7	d8, 8	8. 991$_n$	0. 788	+4. 16	+24. 8
28	8 58 51	23 20 43. 16	− 5 39 1. 7	+0 35. 64	+ 0 31. 4	t30, 10	7. 840	0. 789	+4. 16	+24. 8
29	9 4 32	23 20 24. 93	− 5 40 0. 4	−1 55. 08	+ 1 35. 7	t30, 10	8. 429	0. 789	+4. 17	+24. 8
1918										
Dec. 2	17 7 56	6 58 42. 46	+22 12 52. 4	+0 42. 03	− 1 16. 0	t30, 10	9. 533	0. 508	+5. 64	−10. 8
26	15 1 48	6 48 18. 95	+22 25 52. 9	+3 33. 02	− 0 16. 0	t25, 5	9. 487	0. 482	+6. 20	− 9. 9
1919										
Jan. 29	9 51 54	6 33 27. 93	+22 54 27. 7	−2 36. 13	− 1 44. 9	t25, 5	8. 258$_n$	0. 380	+2. 82	− 5. 7
31	12 18 40	6 32 47. 13	+22 56 8. 8	−3 16. 93	− 0 3. 9	t25, 5	9. 474	0. 466	+2. 82	− 5. 6
1922										
May 29	11 13 44	12 31 46. 45	− 2 22 48. 8	−0 2. 47	− 3 54. 0	d10, 8	9. 527	0. 755	+1. 99	−11. 0
1923										
Apr. 18	13 56 29	14 52 6. 38	−15 7 1. 6	−0 11. 54	+ 3 28. 8	d10, 8	9. 007	0. 848	+2. 08	− 2. 8
1926										
Aug. 30	11 15 42	21 33 3. 79	−15 58 57. 0	−1 28. 71	− 3 14. 0	t25, 5	8. 547	0. 855	+2. 40	+12. 7
Sept. 10	11 35 1	21 27 4. 69	−16 19 22. 4	−2 21. 90	+ 2 59. 4	t25, 5	9. 241	0. 849	+2. 37	+12. 0
11	11 27 28	21 26 35. 17	−16 20 52. 5	+1 40. 06	+ 3 32. 0	t30, 10	9. 225	0. 850	+2. 35	+11. 8

SATELLITE VI OF JUPITER

Mean Place of Comparison Star for beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
10 24 31. 46	+10 59 32. 2	AG Leipzig I, 4040	4	26		Fn.	Moonlight for last 2 transits.
10 29 15. 18	+10 52 28. 8	Palisa and Bidschof, 372	3	26		Fn.	V. ft.
10 24 31. 46	+10 59 32. 2	AG Leipzig I, 4040	2	26		Fn.	
10 24 31. 46	+10 59 32. 2	AG Leipzig I, 4040		26		Fn.	
10 24 31. 46	+10 59 32. 2	AG Leipzig I, 4040	3	26		Fn.	
10 24 31. 46	+10 59 32. 2	AG Leipzig I, 4040		26		Fn.	V. v. ft.
12 31 11. 13	− 1 50 50. 3	AG Nicolajew, 3431		26	388	Ep.	Near ft. star.
12 31 11. 13	− 1 50 50. 3	AG Nicolajew, 3431		26	388	Ep.	
12 25 42. 30	− 1 26 40. 2	AG Nicolajew, 3424	3	26	388	Ep.	
14 46 52. 60	−14 38 15. 8	AG Washington, 5492		26		Ep.	
14 46 9. 14	−14 39 36. 8	AG Washington, 5478		26		Ep.	
14 36 36. 20	−14 4 53. 0	AG Harvard, 5153		26		Ep.	
14 34 47. 61	−13 42 13. 4	AG Harvard, 5141		26		Ep.	
14 17 1. 32	−12 38 23. 0	AG Harvard, 5047	3	26		Ep.	
16 49 51. 10	−21 49 37. 8	AG Algiers, 6899; c. w. 6895	3	26	388	Bn.	V. ft.
16 42 59. 97	−21 15 30. 7	AG Algiers, 6852	4	26	388	Bn.	V. ft.
16 43 45. 98	−21 13 23. 7	AG Algiers, 6857; c. w. 6852; c. w. 6826	4	26	388	Bn.	
16 42 59. 97	−21 15 30. 7	AG Algiers, 6852	4	26	388	Bn.	V. ft.
16 31 4. 22	−20 55 15. 5	AG Algiers, 6799	4	26	388	Bn.	
19 19 22. 09	−22 51 55. 7	Cordoba A, 13510	2	26	183	Bn.	V. ft. Stopped by dawn. Unsatisfactory.
19 14 31. 85	−22 48 6. 0	Cordoba A, 13447	4	26	183	Bn.	
19 13 42. 26	−23 0 28. 6	Cordoba A, 13436	3	26	183	Bn.	
19 3 29. 05	−23 19 40. 6	Cordoba A, 13303	3	26	183	Bn.	
19 1 16. 62	−23 23 13. 2	Cordoba A, 13269	3	26	183	Bn.	V. ft.
21 10 18. 02	−17 42 5. 8	AG Washington, 8006	2	26	183	Bn.	
21 8 58. 34	−17 55 11. 5	AG Washington, 7994	4	26	388	Bn.	V. ft.
21 9 9. 63	−17 57 56. 9	AG Algiers, 9097	4	26	183	Bn.	V. ft.
23 20 3. 36	− 5 39 57. 9	AG Straszburg, 8047	4	26	388	Bn.	V. ft. Moonlight.
23 20 36. 69	− 5 40 42. 1	AG Straszburg, 8051; AG Wien-Ott. 8311	3	26	388	Bn.	
23 20 3. 36	− 5 39 57. 9	AG Straszburg, 8047	3	26	388	Bn.	
23 22 15. 84	− 5 42 0. 9	AG Straszburg, 8055; AG Wien-Ott 8318	4	26	388	Bn.	
6 57 54. 79	+22 14 19. 2	AG Berlin B, 2738	4	26	388	Bn.	
6 44 39. 73	+22 26 18. 8	AG Berlin B, 2616	3	26	388	Bn.	
6 36 1. 24	+22 56 18. 3	AG Berlin B, 2521	3	26	183	Bn.	Ft.
6 36 1. 24	+22 56 18. 3	AG Berlin B, 2521	3	26	388	Bn.	
12 31 46. 93	− 2 18 43. 8	Ast Alg−2°.1232,97; Fer−3°.1228,76	3	26	183	B.	$14^m \pm$ Ft.
14 52 15. 84	−15 10 27. 6	Comp. with AG Washington 5529	3	26	183	B.	
21 34 30. 10	−15 55 55. 7	AG Washington, 8140	4	26	183	Bn.	V. ft. Unsteady.
21 29 24. 22	−16 22 33. 8	AG Washington, 8106	4	26	183	Bn.	
21 24 52. 76	−16 24 36. 3	AG Washington, 8083	2	26	367	Bn.	

SATELLITES OF SATURN

TETHYS—MIMAS

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1908	h m s	°	h m s	"			in.			
Aug. 29	11 41 48	272. 35	11 42 10	74. 49	4, 4	2	26	375, Brt.	Hd.	
30	11 36 4	87. 80	11 36 14	15. 18	4, 4	2	26	375, Brt.	Hd.	
Sept. 6	11 52 48	102. 25	11 53 5	43. 23	4, 4	3	26	388, Brt.	Hd.	Mimas v. difficult.
8	11 6 50	98. 12	11 7 8	49. 59	4, 4	2	26	388, Red.	Hd.	
29	12 34 13	91. 52	12 34 29	19. 22	4, 4	2	26	388, Brt.	Hd.	
30	10 34 43	276. 06	10 35 1	74. 57	4, 6	2	26	388, Brt.	Hd.	
1910										
Sept. 12	13 23 23	198. 89	13 24 58	12. 42	4, 4	2	26	388, Red.	Hl.	
26	14 8 34	91. 26	14 9 35	67. 28	4, 4	2–3	26	388, Brt.	Hl.	Mimas v. ft.
Oct. 17	11 35 39	77. 74	11 40 5	63. 80	4, 5	2	26	388, Brt.	Hl.	
18	11 9 23	198. 35	11 18 55	6. 43	2, 1	2	26	388, Blk.	Hl.	Moonlight. Too close to planet to finish.
1911										
Sept. 6	15 45 17	109. 02	-- -- --	-----	4, 0	3	26	367, Red.	Bn.	Clouded.
24	13 12 19	49. 85	13 12 30	24. 90	4, 4	3	26	367p, Red.	Bn.	Haze at times.
24	13 42 58	42. 00	13 43 40	23. 28	4, 4	3	26	367p, Red.	Bn.	
Oct. 13	11 45 38	13. 05	11 45 34	22. 62	4, 4	2	26	367, Brt.	Bn.	
13	12 11 10	1. 62	12 10 2	22. 73	4, 4	2	26	367, Brt.	Bn.	
25	15 9 33	119. 64	15 11 13	38. 39	4, 4	2–3	26	367, Brt.	Bn.	
25	15 28 29	116. 38	15 29 28	39. 98	4, 4	2–3	26	367, Brt.	Bn.	
Dec. 6	12 18 58	92. 22	12 20 5	20. 01	4, 4	1–2	26	367, Brt.	Bn.	Bright moonlight.
6	12 37 2	93. 10	12 38 18	19. 68	4, 4	1–2	26	367, Brt.	Bn.	
19	7 33 32	119. 30	7 32 40	30. 04	4, 4	2–3	26	367, Brt.	Bn.	
19	8 1 58	114. 77	8 3 3	31. 86	4, 4	2–3	26	367, Brt.	Bn.	
1912										
Sept. 20	14 14 30	78. 40	14 16 26	70. 46	4, 4	3	26	495b, Brt.	Bn.	
20	15 4 28	73. 74	15 6 10	65. 02	4, 4	3	26	495b, Brt.	Bn.	
Oct. 4	11 55 5	278. 86	11 56 18	17. 79	4, 4	2	26	495b, Brt.	Bn.	
4	13 53 24	285. 55	13 54 15	16. 05	4, 4	3	26	495b, Brt.	Bn.	
5	14 0 3	89. 61	14 2 10	77. 43	4, 4	3	26	495b, Brt.	Bn.	
10	15 50 3	255. 85	15 51 12	54. 02	4, 4	2	26	495b, Brt.	Bn.	
15	12 53 50	296. 73	12 52 57	26. 83	4, 4	3–4	26	495b, Brt.	Bn.	
28	14 25 20	348. 66	14 24 56	21. 15	4, 4	2	26	495b, Brt.	Bn.	
29	14 43 48	240. 67	14 46 16	51. 26	4, 4	3	26	495b, Brt.	Bn.	
Nov. 9	12 11 29	294. 81	12 11 56	24. 48	4, 4	3–4	26	495b, Brt.	Bn.	
18	10 46 52	308. 74	10 48 30	20. 53	4, 4	2	26	495b, Brt.	Bn.	
18	11 32 35	302. 34	11 33 17	20. 54	4, 4	2	26	495b, Brt.	Bn.	
22	13 17 23	315. 05	13 17 43	13. 10	4, 4	4	26	495b, Brt.	Bn.	
30	12 16 48	263. 74	12 17 43	61. 86	4, 4	2	26	367p, Brt.	Bn.	
Dec. 9	11 51 27	328. 13	11 53 47	11. 46	4, 4	4	26	495p, Brt.	Bn.	
14	8 34 32	89. 25	8 34 2	75. 43	4, 4	2	26	495b, Brt.	Bn.	Interrupted by haze.
28	9 39 58	336. 21	9 41 1	14. 25	4, 4	3	26	495b, Brt.	Bn.	
30	9 17 24	309. 55	9 18 49	23. 18	4, 4	3	26	495b, Brt.	Bn.	
1913										
Jan. 14	9 29 50	337. 47	9 30 52	15. 87	4, 4	2	26	495b, Brt.	Bn.	
1914										
Oct. 2	15 30 18	62. 64	15 31 44	21. 63	2, 2	2	26	367b, Brt.	Hl.	Moonlight. *p* changed 180°.
Nov. 23	12 13 16	265. 99	12 13 24	80. 11	2, 2	2	26	367b, Red.	Hl.	
23	12 33 10	264. 41	12 33 25	81. 20	2, 2	2	26	367b, Red.	Hl.	
Dec. 12	10 11 16	259. 68	10 9 7	80. 58	2, 2	2	26	367b, Red.	Hl.	Haze. Mimas went out.
15	16 9 30	54. 74	16 8 40	42. 08	2, 2	2	26	388, Red.	Hl.	
15	16 24 38	52. 07	16 23 11	40. 63	2, 2	2	26	388, Red.	Hl.	
27	10 48 48	266. 28	10 49 4	81. 45	2, 2	2	26	367b, Red.	Hl.	
27	11 7 0	264. 81	11 8 54	81. 63	2, 2	2	26	367b, Red.	Hl.	

SATELLITES OF SATURN

TETHYS—MIMAS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1915	h m s	°	h m s	"			in.			
Jan. 4	11 29 18	122. 73	11 29 26	34. 76	2, 2	2	26	388, Brt.	Hl.	
4	11 47 33	119. 62	11 47 54	35. 56	2, 2	2	26	388, Brt.	Hl.	
4	12 55 8	109. 21	12 55 16	38. 51	2, 2	2	26	367b, Red.	Hl.	
4	13 16 56	107. 44	13 17 18	38. 51	2, 2	2	26	367b, Brt.	Hl.	
13	9 27 46	270. 03	9 29 26	79. 00	2, 2	2	26	367b, Brt.	Hl.	
13	9 44 18	268. 36	9 43 10	79. 77	2, 2	2	26	367b, Brt.	Hl.	
29	9 59 32	94. 92	9 49 36	17. 08	2, 2	3–4	26	367b, Red.	Hl.	Delayed by haze and clds.
29	10 43 2	95. 09	10 43 15	18. 41	2, 2	3–4	26	367b, Red.	Hl.	
Feb. 17	8 50 12	100. 34	8 42 47	22. 26	2, 2	2	26	367b, Red.	Hl.	Mimas v. ft. Haze.
Mar. 13	8 4 17	145. 12	8 1 59	20. 54	2, 2	2	26	367b, Red.	Hl.	
13	8 31 6	138. 40	8 24 18	20. 83	2, 2	2	26	367b, Red.	Hl.	
Nov. 9	14 14 37	286. 44	14 22 48	14. 66	4, 4	3–4	26	388, Brt.	Hl.	First two *p*'s with red wires.
27	13 36 25	87. 28	13 38 10	77. 11	4, 4	2–3	26	388, Brt.	Hl.	Mimas ft.
Dec. 22	12 22 38	337. 16	12 22 47	17. 23	4, 4	2	26	367b, Red.	Hl.	
1916										
Feb. 3	9 7 14	95. 59	9 4 58	69. 54	2, 2	3	26	367b, Red.	Hl.	
3	9 36 16	93. 49	9 38 20	72. 43	2, 2	3	26	367b, Red.	Hl.	

RHEA—MIMAS

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1908										
Aug. 29	11 48 29	281. 12	11 48 33	66. 55	4, 4	2	26	375, Brt.	Hd.	
30	11 42 54	270. 89	11 42 58	107. 94	4, 4	2	26	375, Brt,	Hd.	
Sept. 6	11 44 54	90. 40	11 44 21	101. 73	4, 4	3	26	3883 Brt.	Hd.	Mimas v. difficult.
8	11 12 59	272. 98	11 13 2	60. 02	4, 4	2	26	388, Red.	Hd.	
29	12 42 14	357. 40	12 42 4	9. 84	6, 4	2	26	388, Brt.	Hd.	
30	10 51 31	277. 32	10 51 42	97. 84	4, 6	2	26	388, Brt.	Hd.	
1910										
Oct. 17	10 50 35	185. 71	10 47 30	22. 22	4, 4	2	26	388, Brt.	Hl.	Mimas v. ft. Moonlight.
1911										
Sept. 6	15 3 51	289. 50	15 20 49	42. 87	4, 4	2–3	26	367, Red.	Bn.	Moonlight. Haze.
24	12 19 42	304. 18	12 20 58	33. 71	4, 4	2	26	367p, Red.	Bn.	
24	12 42 9	304. 92	12 42 51	34. 57	4, 4	2	26	367p, Red.	Bn.	
Oct. 13	11 7 20	260. 56	11 7 36	52. 79	4, 4	2	26	367, 'Brt.	Bn.	
13	11 22 2	260. 95	11 22 23	53. 14	4, 4	2	26	367, Brt.	Bn.	
26	15 7 31	275. 94	15 8 57	57. 32	4, 4	3	26	367, Brt.	Bn.	
26	15 26 54	276. 33	15 29 9	58. 15	4, 4	3	26	367, Brt.	Bn.	
Nov. 16	8 47 57	80. 34	8 48 53	112. 00	4, 4	3	26	367, Brt.	Bn.	
16	9 7 1	79. 37	9 6 22	111. 21	4, 4	3	26	367, Brt.	Bn.	
1912										
Sept. 20	14 39 8	280. 50	14 39 34	64. 35	4, 4	3	26	495b, Brt.	Bn.	
20	15 31 51	279. 39	15 32 7	70. 83	4, 4	3	26	495b, Brt.	Bn.	
Oct. 4	12 50 21	247. 19	12 51 5	59. 12	4, 4	2	26	495b, Brt.	Bn.	
4	14 17 4	246. 37	14 15 30	51. 55	4, 4	3	26	495b, Brt.	Bn.	
5	14 28 40	117. 56	14 29 14	62. 05	4, 4	3	26	495b, Brt.	Bn.	
15	12 23 20	95. 40	12 24 3	59. 58	4, 4	3–4	26	495b, Brt.	Bn.	
28	15 19 29	116. 26	15 20 16	45. 84	4, 4	2	26	495b, Brt.	Bn.	
29	13 6 59	57. 63	13 7 59	49. 19	4, 4	3	26	495b, Brt.	Bn.	
29	15 11 7	57. 96	15 11 52	41. 15	4, 4	3	26	495b, Brt.	Bn.	
Nov. 9	12 31 27	268. 08	12 33 5	61. 61	4, 4	4	26	495b, Brt.	Bn.	
18	11 11 32	261. 90	11 13 22	115. 59	4, 4	2	26	495b, Brt.	Bn.	
18	11 50 57	260. 04	11 52 28	111. 82	4, 4	2	26	495b, Brt.	Bn.	
22	13 41 1	283. 00	13 41 16	51. 07	4, 4	3	26	495b, Brt.	Bn.	
30	12 44 23	11. 80	12 44 11	41. 98	4, 4	2	26	495b, Brt.	Bn.	
Dec. 13	9 53 55	80. 31	9 54 31	116. 20	4, 4	3	26	367b, Brt.	Bn.	
28	8 43 45	313. 37	8 45 17	34. 14	4, 4	3	26	495b, Brt.	Bn.	
28	10 9 18	313. 07	10 11 1	38. 52	4, 4	3–4	26	495b, Brt.	Bn.	

SATELLITES OF SATURN

RHEA—MIMAS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1913	h m s	°	h m s	″			in.			
Jan. 14	9 47 48	71. 04	9 48 30	93. 80	4, 4	2	26	495b, Brt.	Bn.	
1914										
Nov. 23	13 44 19	35. 42	13 43 19	36. 67	2, 2	2	26	367b, Brt.	Hl.	
23	13 57 26	35. 36	13 56 42	36. 30	2, 2	2	26	367b, Brt.	Hl.	
Dec. 15	15 24 32	82. 04	15 26 14	119. 99	2, 2	2	26	367b, Red.	Hl.	
15	15 43 46	81. 03	15 46 20	119. 98	2, 2	2	26	367b, Red.	Hl.	
18	11 35 26	195. 13	11 33 53	40. 22	2, 2	2	26	388, Brt.	Hl.	First half with 367b.
18	11 53 7	192. 84	11 50 52	38. 88	2, 2	2	26	388, Brt.	Hl.	
1915										
Jan. 4	9 49 25	281. 31	9 49 39	50. 87	2, 2	2	26	367b, Red.	Hl.	
4	10 11 54	282. 10	10 12 18	50. 66	2, 2	2	26	367b, Red.	Hl.	
4	12 15 30	284. 01	12 15 41	55. 41	2, 2	2	26	367b, Red.	Hl.	
4	12 33 34	283. 88	12 34 32	56. 72	2, 2	2	26	367b, Red.	Hl.	
4	14 14 34	282. 31	14 17 41	67. 11	2, 2	2	26	367b, Red.	Hl.	Mimas v. ft.
4	14 37 4	281. 67	14 37 51	69. 48	2, 2	2	26	367b, Red.	Hl.	Mimas v. ft.
5	8 30 36	219. 53	8 28 37	47. 84	2, 2	2	26	388, Brt.	Hl.	Mimas ft. Stopped by haze.
13	10 4 5	275. 67	10 2 38	109. 44	2, 2	2	26	367b, Brt.	Hl.	
14	9 12 8	246. 64	9 22 51	97. 46	1, 2	2	26	367b, Brt.	Hl.	Clouded.
15	8 24 28	148. 36	8 18 38	41. 18	2, 2	3	26	367b, Red.	Hl.	Mimas v. ft.
Mar. 12	8 13 47	40. 38	8 12 48	48. 06	2, 2	3	26	367b, Red.	Hl.	
12	8 39 34	38. 20	8 38 34	47. 94	2, 2	3	26	367b, Red.	Hl.	
13	9 5 4	277. 21	9 8 4	54. 06	2, 2	2	26	367b, Red.	Hl.	
13	9 38 12	277. 54	9 38 54	56. 45	2, 2	2	26	367b, Red.	Hl.	
1915										
Nov. 3	13 19 2	265. 60	13 16 32	111. 23	2, 2	2	26	367b, Brt.	Hl.	
3	13 51 20	263. 83	13 51 44	110. 63	2, 2	2	26	367b, Brt.	Hl.	
17	14 56 0	254. 88	14 55 40	107. 66	4, 4	2	26	367b, Brt.	Hl.	
Dec. 6	13 16 14	194. 61	13 27 47	44. 82	4, 4	2	26	367b, Brt.	Hl.	First two *p's* with red wires. Delayed by lights burning out.

TETHYS—ENCELADUS

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1908										
Aug. 29	11 29 14	269. 92	11 29 33	74. 82	8, 8	2	26	375, Brt.	Hd.	
30	11 51 28	72. 35	11 51 27	19. 17	8, 8	2	26	375, Brt.	Hd.	
31	12 28 56	245. 28	12 28 47	2. 58	8, 8	3	26	388, Brt.	Hd.	
Sept. 1	12 45 30	91. 71	12 45 47	45. 00	8, 8	2	26	375, Brt.	Hd.	
6	12 2 10	260. 00	12 1 45	24. 49	8, 8	3	26	388, Brt.	Hd.	
8	11 24 5	101. 22	11 24 14	59. 16	8, 8	2	26	388, Brt.	Hd.	
12	11 33 56	98. 42	11 33 42	66. 62	8, 8	1	26	388, Brt.	Hd.	
30	9 55 20	272. 98	9 55 36	12. 51	8, 8	2	26	388, Brt.	Hd.	
30	11 11 9	272. 33	11 11 17	10. 28	8, 8	2	26	388, Brt.	Hd.	
Oct. 3	9 57 15	90. 07	9 57 27	74. 15	8, 8	3	26	388, Brt.	Hd.	Unsteady.
5	9 37 40	35. 47	9 37 34	1. 95	8, 8	1	26	388, Brt.	Hd.	
7	9 52 22	88. 07	9 52 29	59. 68	8, 8	2	26	388, Brt.	Hd.	
14	9 41 58	94. 62	9 42 9	60. 40	8, 8	2	26	388, Brt.	Hd.	
1909										
Oct. 20	10 14 15	279. 77	10 31 47	7. 94	4, 4	3	26	388, Brt.	Hl.	
20	10 58 12	279. 72	10 42 32	8. 02	4, 4	3	26	388, Brt.	Hl.	
25	7 56 54	84. 18	8 7 30	10. 18	4, 4	2–3	26	388, Brt.	Hl.	
25	8 29 30	83. 84	8 18 46	9. 76	4, 4	2–3	26	388, Brt.	Hl.	
Dec. 6	7 28 8	73. 04	7 29 3	39. 65	4, 4	3	26	388, Brt.	Hl.	
6	7 49 14	70. 40	7 48 38	36. 39	4, 4	3	26	388, Brt.	Hl.	

SATELLITES OF SATURN

TETHYS—ENCELADUS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1910	h m s	°	h m s	″			in.			
Sept. 12	14 12 27	253. 19	14 11 11	63. 18	4, 4	2	26	388, Red.	Hl.	
12	14 47 9	250. 18	14 49 53	57. 44	4, 4	2	26	388, Brt.	Hl.	
16	13 14 20	251. 66	13 14 52	43. 27	4, 4	2	26	388, Brt.	Hl.	Moonlight.
22	12 22 47	105. 97	12 26 1	64. 76	4, 4	2–3	26	388, Brt.	Hl.	Moonlight. Clds.
29	13 38 43	144. 96	13 37 28	14. 38	4, 4	2–3	26	388, Brt.	Hl.	
Oct. 1	12 8 40	264. 26	12 11 30	58. 10	4, 4	3	26	388, Brt.	Hl.	
5	11 54 23	249. 29	11 54 29	8. 56	4, 4	2–3	26	388, Brt.	Hl.	
10	11 18 23	305. 24	11 19 17	5. 46	4, 4	3–4	26	388, Brt.	Hl.	
Nov. 19	10 30 25	271. 15	10 31 9	13. 37	4, 4	3	26	388, Brt.	Hl.	
25	10 6 8	250. 50	10 4 40	36. 59	4, 4	3	26	388, Brt.	Hl.	
Dec. 9	8 58 42	83. 94	9 13 22	10. 67	2, 2	3	26	388, Brt.	Hl.	Enceladus too ft. to finish.
17	8 5 50	277. 70	8 6 0	72. 27	4, 4	2	26	388, Brt.	Hl.	
1911										
Jan. 6	7 0 47	90. 62	7 3 41	77. 59	4, 4	3–4	26	388, Brt.	Hl.	
Sept. 6	14 7 47	231. 59	14 20 52	35. 44	4, 4	3	26	367, Brt.	Hl.	
20	14 29 16	83. 68	14 29 24	26. 71	4, 4	2–3	26	388, Red.	Hl.	
20	14 55 42	82. 08	14 57 16	27. 31	4, 4	2–3	26	388, Red.	Hl.	
30	12 8 15	323. 39	12 7 7	10. 86	4, 4	2–3	26	367p, Red.	Hl.	
30	12 39 15	315. 38	-- -- --	-----	4, 0	2–3	26	367p, Red.	Hl.	
Oct. 13	12 48 48	279. 00	12 48 58	67. 69	4, 4	2	26	367, Brt.	Hl.	Enceladus v. ft. Haze.
25	13 54 37	259. 82	13 53 20	25. 18	4, 4	2	26	367p, Brt.	Hl.	
25	14 26 29	257. 19	14 25 49	25. 20	4, 4	2	26	367p, Brt.	Hl.	
26	10 44 56	76. 36	-- -- --	-----	4, 0	2	26	367p, Brt.	Hl.	V. ft. at times. Haze.
26	14 32 7	49. 14	14 31 19	37. 71	4, 4	2	26	367p, Brt.	Hl.	
Nov. 1	11 3 58	291. 52	11 6 14	63. 94	4, 4	3–4	26	367p, Brt.	Hl.	
1	11 48 34	287. 14	11 39 44	68. 86	4, 3	3–4	26	367p, Brt.	Hl.	Very unsteady.
Dec. 4	9 0 3	234. 88	9 2 32	9. 82	4, 4	3	26	367, Brt.	Hl.	Windy. Bright moonlight.
4	9 36 23	228. 94	9 37 7	9. 79	4, 4	3	26	367, Brt.	Hl.	
5	8 7 13	27. 31	8 10 6	24. 65	4, 4	2–3	26	367, Brt.	Hl.	Bright moonlight.
5	8 35 58	16. 22	8 36 12	23. 50	4, 4	2–3	26	367, Brt.	Hl.	
1912										
Oct. 1	14 20 17	112. 39	14 20 47	63. 96	4, 4	3–4	26	495, Brt.	Bn.	Occulting strip over planet.
2	12 4 34	279. 13	12 5 17	62. 63	4, 4	3	26	495p, Brt.	Bn.	
2	13 42 28	272. 45	13 43 27	65. 18	4, 4	3	26	495p, Brt.	Bn.	
4	12 23 48	355. 47	12 24 25	14. 58	4, 4	2	26	495p, Brt.	Bn.	
4	14 43 0	317. 83	14 43 50	20. 15	4, 4	3	26	495p, Brt.	Bn.	
5	11 57 12	122. 26	11 58 22	46. 56	4, 4	3	26	495p, Brt.	Bn.	
10	12 11 42	268. 16	12 12 49	73. 99	4, 4	3–4	26	495p, Brt.	Bn.	
16	15 54 14	115. 36	15 55 55	61. 83	4, 4	3	26	495p, Brt.	Bn.	
26	11 55 10	79. 05	11 56 30	85. 23	4, 4	4	26	367p, Brt.	Bn.	
28	13 54 20	321. 33	13 55 21	10. 32	4, 4	2	26	495p, Brt.	Bn.	
Nov. 9	14 14 33	275. 89	14 15 19	75. 59	4, 4	3–4	26	367p, Brt.	Bn.	
18	13 7 5	65. 85	13 8 23	29. 05	4, 4	2	26	495p, Brt.	Bn.	
22	11 17 22	270. 04	11 19 16	26. 75	4, 4	3	26	495p, Brt.	Bn.	
30	10 16 11	258. 16	10 17 21	85. 33	4, 4	2	26	367p, Brt.	Bn.	
Dec. 9	10 28 27	358. 90	10 28 29	31. 55	4, 4	3–4	26	367p, Brt.	Bn.	
14	11 22 24	100. 59	11 22 26	67. 72	4, 4	2	26	367p, Brt.	Bn.	Haze.
20	7 49 42	71. 66	7 51 22	75. 84	4, 4	3	26	367p, Brt.	Bn.	
30	11 8 26	270. 65	11 9 24	87. 87	4, 4	3–4	26	367p, Brt.	Bn.	
1913										
Jan. 4	9 25 19	73. 78	9 25 22	77. 47	4, 4	3–4	26	367p, Brt.	Bn.	
4	10 20 56	68. 78	10 22 14	71. 04	4, 4	4	26	367p, Brt.	Bn.	
1914										
Sept. 26	14 48 49	109. 18	14 48 8	57. 82	2, 2	3	26	388, Brt.	Hl.	
28	13 39 6	98. 40	13 39 59	6. 71	2, 2	2–3	26	388, Brt.	Hl.	
28	14 1 56	102. 15	14 3 12	6. 50	2, 2	2–3	26	388, Brt.	Hl.	
Oct. 1	14 51 9	260. 93	14 52 6	78. 45	2, 2	2–3	26	367b, Brt.	Hl.	
1	15 23 33	258. 68	15 23 58	77. 36	2, 2	2–3	26	367b, Brt.	Hl.	

SATELLITES OF SATURN

TETHYS—ENCELADUS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1914	h m s	°	h m s	″			in.			
Oct. 2	14 10 50	62. 62	14 9 38	41. 19	4, 4	2	26	367b, Brt.	Hl.	Moonlight.
18	15 2 7	269. 41	15 3 33	8. 83	2, 2	3	26	367b, Brt.	Hl.	
18	15 18 11	267. 60	15 18 21	8. 80	2, 2	3	26	367b, Brt.	Hl.	
19	15 5 22	103. 43	15 8 26	42. 93	2, 2	2	26	388, Brt.	Hl.	
19	15 26 39	101. 71	15 26 30	44. 22	2, 2	2	26	388, Brt.	Hl.	
27	12 58 2	304. 87	12 56 50	31. 75	2, 2	3	26	388, Brt.	Hl.	
27	13 39 21	298. 28	13 38 20	34. 03	2, 2	3	26	388, Red.	Hl.	
30	14 47 36	142. 77	14 47 54	40. 55	2, 2	3	26	388, Brt.	Hl.	
30	15 1 56	139. 27	15 3 10	42. 10	2, 2	3	26	388, Brt.	Hl.	
31	14 3 48	283. 37	14 3 30	67. 50	2, 2	2	26	388, Brt.	Hl.	
31	14 17 0	282. 23	14 17 18	69. 16	2, 2	2	26	388, Brt.	Hl.	
Nov. 2	12 24 31	272. 72	12 23 32	8. 80	2, 2	3	26	388, Brt.	Hl.	
2	13 2 32	275. 29	13 1 42	8. 09	2, 2	3	26	367b, Brt.	Hl.	Enceladus v. ft. Haze.
5	12 18 3	84. 15	12 19 22	85. 31	2, 2	2	26	388, Red.	Hl.	Haze.
5	12 39 42	82. 52	12 40 34	84. 83	2, 2	2	26	388, Red.	Hl.	Haze.
6	14 22 31	228. 49	14 18 58	33. 88	2, 2	2	26	388, Brt.	Hl.	
6	14 43 40	225. 14	14 43 56	31. 65	2, 2	2	26	388, Brt.	Hl.	Moonlight.
9	13 54 22	72. 62	13 57 14	78. 46	2, 2	3	26	367b, Brt.	Hl.	
9	14 10 56	71. 40	14 10 48	78. 32	2, 2	3	26	367b, Brt.	Hl.	
11	11 42 32	1. 73	11 42 1	25. 49	2, 2	2	26	388, Brt.	Hl.	
11	12 6 30	354. 44	12 6 20	25. 08	2, 2	2	26	388, Brt.	Hl.	
16	12 18 53	99. 21	12 19 4	48. 45	2, 2	3	26	388, Brt.	Hl.	
16	12 33 49	98. 02	12 34 48	48. 75	2, 2	3	26	388, Brt.	Hl.	
17	13 28 8	294. 44	13 28 44	6. 11	2, 2	2	26	388, Brt.	Hl.	
17	13 40 56	295. 32	13 39 50	5. 72	2, 2	2	26	388, Brt.	Hl.	Haze.
21	11 52 26	75. 63	11 51 29	54. 65	2, 2	2	26	367b, Brt.	Hl.	
21	12 20 12	73. 68	12 20 18	52. 98	2, 2	2	26	367b, Brt.	Hl.	
22	12 23 58	78. 84	12 24 42	10. 46	2, 2	3	26	388, Brt.	Hl.	
22	12 42 5	78. 61	12 40 6	10. 25	2, 2	3	26	367b, Brt.	Hl.	
23	11 30 42	296. 61	11 32 24	32. 73	2, 2	2–3	26	388, Brt.	Hl.	
23	11 49 6	294. 24	11 48 35	34. 13	2, 2	2–3	26	388, Brt.	Hl.	
Dec. 16	14 6 21	114. 20	14 4 30	36. 22	2, 2	3	26	388, Brt.	Hl.	
16	14 23 27	112. 38	14 23 54	37. 27	2, 2	3	26	388, Brt.	Hl.	Enceladus ft.
21	12 26 30	269. 84	12 27 32	54. 14	2, 2	3	26	388, Brt.	Hl.	
21	12 40 58	268. 55	12 40 50	53. 89	2, 2	3	26	388, Brt.	Hl.	
1915										
Jan. 4	9 4 38	204. 15	9 5 58	44. 16	2, 2	2	26	388, Brt.	Hl.	
4	9 18 53	200. 21	9 19 2	42. 86	2, 2	2	26	388, Brt.	Hl.	
9	9 39 18	287. 92	9 38 18	67. 75	2, 2	2	26	367b, Brt.	Hl.	
9	9 55 35	285. 93	9 55 45	70. 12	2, 2	2	26	367b, Brt.	Hl.	
13	8 29 56	287. 68	8 29 56	63. 06	2, 2	3	26	388, Brt.	Hl.	
13	8 45 58	286. 01	8 47 48	65. 67	2, 2	3	26	388, Brt.	Hl.	
15	10 32 19	227. 92	10 32 2	38. 05	2, 2	2	26	388, Brt.	Hl.	
15	10 46 32	225. 38	10 45 12	36. 72	2, 2	2	26	388, Brt.	Hl.	
21	9 16 22	136. 56	9 16 42	6. 23	2, 2	2	26	367b, Red.	Hl.	
21	9 38 36	136. 96	9 38 52	5. 83	2, 2	2	26	367b, Red.	Hl.	Enceladus ft.
Feb. 10	8 47 35	283. 58	8 45 58	10. 00	2, 2	2	26	388, Brt.	Hl.	
10	9 8 8	281. 93	9 10 8	9. 58	2, 2	2	26	367b, Brt.	Hl.	
17	10 34 53	88. 03	10 33 10	79. 88	2, 2	2–3	26	388, Brt.	Hl.	Enceladus ft.
17	10 55 10	86. 84	10 57 16	80. 83	2, 2	2–3	26	367b, Brt.	Hl.	First angle with 388. Enceladus ft.
18	9 16 49	253. 97	9 13 42	79. 79	2, 2	2	26	367b, Brt.	Hl.	
18	9 39 6	252. 24	9 39 8	77. 57	2, 2	2	26	367b, Brt.	Hl.	
Mar. 13	10 12 4	247. 43	10 11 14	38. 97	2, 2	2–3	26	--- ---	Hl.	Enceladus too ft. to finish.
27	7 34 40	24. 62	7 33 40	7. 00	2, 2	2–3	26	388, Brt.	Hl.	
27	7 56 16	23. 71	7 53 47	6. 67	2, 2	2–3	26	388, Brt.	Hl.	
31	7 51 11	306. 40	7 49 22	32. 31	2, 2	2–3	26	388, Red.	Hl.	
31	8 13 12	302. 37	8 13 44	33. 61	2, 2	2–3	26	388, Red.	Hl.	

SATELLITES OF SATURN

DIONE—TETHYS

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1908	h m s	°	h m s	″			in.			
Aug. 29	12 10 25	85. 58	12 10 42	67. 45	8, 8	2	26	375, Brt.	Hd.	
30	12 3 32	270. 09	12 3 44	97. 90	8, 8	2	26	375, Brt.	Hd.	
31	12 40 8	92. 66	12 40 13	86. 18	8, 8	2	26	388, Brt.	Hd.	
Sept. 1	12 23 51	276. 48	12 23 32	40. 83	8, 8	2	26	375, Brt.	Hd.	
3	11 40 31	100. 08	11 40 30	46. 13	8, 8	2	26	388, Brt.	Hd.	
6	12 12 48	73. 46	12 12 47	33. 45	8, 8	3	26	388, Brt.	Hd.	
8	11 35 3	104. 45	11 34 39	3. 32	8, 8	2	26	388, Brt.	Hd.	
12	11 24 59	281. 48	11 25 9	63. 73	8, 8	1	26	388, Brt.	Hd.	
23	11 8 33	293. 48	11 8 38	35. 77	8, 9	2	26	Brt.	Hd.	V. ft. Haze.
29	11 28 24	274. 09	11 28 26	108. 85	8, 8	2	26	388, Brt.	Hd.	
30	10 25 49	97. 74	10 25 46	86. 48	8, 10	2	26	388, Brt.	Hd.	
Oct. 3	10 9 6	107. 22	10 9 10	14. 65	8, 8	3	26	388, Brt.	Hd.	
4	10 3 24	65. 16	10 3 23	17. 87	8, 8	3	26	388, Brt.	Hd.	
5	9 50 0	265. 43	9 49 47	64. 04	8, 8	1	26	388, Brt.	Hd.	
7	10 6 12	272. 21	10 6 18	72. 59	8, 8	1	26	388, Brt.	Hd.	
14	10 13 23	86. 10	10 13 12	23. 00	8, 8	3	26	388, Brt.	Hd.	
1909										
Sept. 2	13 13 43	100. 63	13 25 51	14. 10	4, 4	3–4	26	--- Brt.	Hl.	Haze. Clds.
2	14 0 27	101. 10	13 41 52	13. 86	4, 4	3–4	26	--- Brt.	Hl.	
Oct. 16	8 32 25	102. 41	8 51 55	57. 78	4, 4	3–4	26	388, Brt.	Hl.	
22	9 23 54	84. 47	9 33 41	58. 36	4, 4	4	26	388, Brt.	Hl.	
22	-- -- --	-----	9 42 44	58. 01	0, 4	4	26	388, Brt.	Hl.	Clouded.
26	11 25 49	106. 14	11 38 58	24. 51	4, 4	2–3	26	388, Brt.	Hl.	
26	12 4 10	103. 98	11 48 49	24. 85	4, 4	2–3	26	388, Brt.	Hl.	
28	8 24 17	336. 70	8 41 30	15. 62	4, 4	4	26	388, Brt.	Hl.	Clds.
28	8 57 38	325. 40	8 47 1	15. 84	4, 4	4	26	388, Brt.	Hl.	
29	9 13 29	235. 65	9 22 41	31. 70	4, 4	3	26	388, Brt.	Hl.	
29	9 41 14	228. 97	9 30 9	30. 76	4, 4	3	26	388, Brt.	Hl.	
Nov. 4	12 17 9	95. 72	12 40 25	97. 76	4, 4	3	26	388, Brt.	Hl.	
4	13 15 27	94. 30	13 0 19	99. 23	4, 4	3	26	388, Brt.	Hl.	
Dec. 5	7 22 43	31. 76	7 30 11	21. 74	2, 2	2	26	388, Brt.	Hl.	
5	7 41 27	23. 46	7 34 16	21. 52	2, 2	2	26	388, Brt.	Hl.	Clouded.
20	8 14 6	98. 76	8 19 43	27. 20	2, 2	2	26	388, Brt.	Hl.	Moonlight.
20	8 30 20	98. 64	8 25 3	26. 95	2, 2	2	26	388, Brt.	Hl.	
1910										
Sept. 7	13 10 21	331. 46	13 10 28	18. 62	4, 4	4	26	388, Brt.	Hl.	
9	14 54 3	162. 11	14 50 29	18. 28	4, 4	3–4	26	388, Brt.	Hl.	
15	13 14 55	98. 81	13 16 41	44. 61	4, 4	3–4	26	388, Brt.	Hl.	
17	12 11 11	160. 20	12 12 3	34. 73	4, 4	2–3	26	388, Brt.	Hl.	Moonlight. Haze.
29	14 44 0	53. 57	14 47 44	50. 91	4, 4	2–3	26	388, Brt.	Hl.	Haze.
Oct. 1	12 48 41	87. 92	12 51 30	73. 22	4, 4	3	26	388, Brt.	Hl.	
5	11 24 34	304. 14	11 25 3	52. 04	4, 4	3	26	388, Brt.	Hl.	
11	12 37 11	267. 47	12 38 35	106. 86	4, 4	4	26	388, Brt.	Hl.	
12	12 3 3	95. 42	12 4 57	104. 57	4, 5	3	26	388, Brt.	Hl.	Ft. Haze. Clouded.
Nov. 18	8 42 25	275. 30	8 43 2	98. 14	4, 4	3	26	388, Brt.	Hl.	
Dec. 25	8 12 35	91. 01	8 14 13	84. 60	4, 4	3	26	388, Brt.	Hl.	
1911										
Jan. 4	8 15 7	270. 55	8 17 27	93. 53	4, 4	3	26	388, Brt.	Hl.	
6	8 48 46	284. 10	8 51 29	67. 00	4, 4	3–4	26	388, Brt.	Hl.	
Sept. 12	14 22 39	289. 77	14 33 51	73. 43	4, 4	4	26	367p, Brt.	Bn.	Moonlight.
12	14 51 44	287. 86	14 42 49	74. 59	4, 4	4	26	367p, Brt.	Bn.	
13	14 42 18	134. 31	14 50 58	31. 14	4, 4	3–4	26	495p, Brt.	Bn.	
13	15 5 41	130. 95	14 57 54	31. 53	4, 4	3–4	26	495p, Brt.	Bn.	
16	16 2 37	209. 07	16 12 45	36. 89	4, 4	4	26	367p, Brt.	Bn.	

SATELLITES OF SATURN

DIONE—TETHYS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1911	h m s	°	h m s	″			in.			
Sept. 16	16 26 25	203. 38	16 18 49	36. 32	4, 4	4	26	367p, Brt.	Bn.	
20	13 26 33	301. 79	13 36 0	13. 64	4, 4	3	26	367p, Brt.	Bn.	
20	13 54 20	300. 88	13 45 8	13. 59	4, 4	3	26	367p, Brt.	Bn.	
Oct. 11	14 6 53	110. 88	14 7 26	77. 11	4, 4	4	26	367p, Brt.	Bn.	
11	14 27 37	109. 41	14 29 10	79. 91	4, 4	4	26	367p, Brt.	Bn.	
12	11 58 23	343. 93	12 0 23	41. 40	4, 4	3	26	367p, Brt.	Bn.	
12	12 21 34	337. 64	12 21 40	42. 72	4, 4	3	26	367p, Brt.	Bn.	Clouded.
Nov. 1	13 46 31	209. 09	13 46 51	21. 13	4, 4	3–4	26	367p, Brt.	Bn.	
1	14 7 24	204. 02	14 8 28	20. 01	4, 4	3–4	26	367p, Brt.	Bn.	
15	8 48 59	270. 56	8 48 57	44. 48	4, 4	4	26	367p, Brt.	Bn.	
15	9 8 17	270. 27	9 9 8	45. 47	4, 4	4	26	367p, Brt.	Bn.	Clouded.
22	12 48 29	61. 48	12 48 50	57. 46	4, 4	2–3	26	367p, Brt.	Bn.	
22	13 6 26	59. 66	13 6 50	55. 68	4, 4	2–3	26	367p, Brt.	Bn.	
30	8 37 19	66. 44	8 38 19	74. 25	4, 4	3–4	26	367p, Brt.	Bn.	
30	8 57 20	64. 74	8 56 5	71, 88	4, 4	3–4	26	367p, Brt.	Bn.	
1912										
Oct. 1	14 42 47	71. 31	14 43 44	27. 66	4, 4	3–4	26	495p, Brt.	Bn.	
2	12 26 53	60. 99	12 27 55	17. 69	4, 4	3	26	495p, Brt.	Bn.	
2	14 3 37	53. 48	14 4 22	17. 87	4, 4	3	26	495p, Brt.	Bn.	
5	12 25 26	284. 78	12 26 49	91. 36	4, 4	3	26	495p, Brt.	Bn.	
7	11 51 24	7. 88	11 51 45	18. 71	4, 4	4	26	495p, Brt.	Bn.	
10	12 44 48	55. 95	12 47 9	68. 58	4, 4	3	26	495p, Brt.	Bn.	
10	14 24 14	43. 51	14 25 1	58. 41	4, 4	2	26	495p, Brt.	Bn.	
16	16 18 26	283. 15	16 19 57	91. 43	4, 4	3	26	495p, Brt.	Bn.	
26	12 19 52	82. 83	12 20 29	14. 03	4, 4	4	26	367p, Brt.	Bn.	
28	13 10 46	199. 24	13 11 55	44. 36	4, 4	4	26	367p, Brt.	Bn.	
Nov. 9	15 17 51	61. 48	15 18 43	70. 90	4, 4	3	26	367p, Brt.	Bn.	
20	13 12 46	79. 11	13 14 9	42. 49	4, 4	2	26	495p, Brt.	Bn.	
22	12 48 7	103. 74	12 48 42	97. 04	4, 4	3	26	367p, Brt.	Bn.	
29	11 1 44	268. 09	11 2 53	110. 30	4, 4	3	26	495p, Brt.	Bn.	Recorded as Enceladus—Tethys, with p differing 180°.
29	12 17 5	264. 47	12 16 45	108. 90	4, 4	4	26	367p, Brt.	Bn.	
30	10 46 8	99. 63	10 48 0	74. 06	4, 4	2	26	367p, Brt.	Bn.	
Dec. 13	11 31 59	196. 74	11 32 7	18. 12	4, 4	3	26	495p, Brt.	Bn.	
14	9 55 34	130. 66	9 55 48	10. 71	4, 4	2–3	26	495p, Brt.	Bn.	
19	8 50 4	109. 89	8 50 25	38. 17	4, 4	3	26	367p, Brt.	Bn.	
20	8 15 43	83. 03	8 16 42	15. 29	4, 4	3–4	26	495p, Brt.	Bn.	
1913										
Jan. 15	8 16 38	266. 96	8 17 22	86. 95	4, 4	2–3	26	367p, Brt.	Bn.	
30	8 4 16	45. 39	8 4 20	41. 75	4, 4	3	26	367p, Brt.	Bn.	
Feb. 1	9 8 19	228. 59	9 8 50	18. 15	4, 4	3	26	495p, Brt.	Bn.	
1914										
Sept. 26	13 52 45	242. 96	13 51 1	18. 18	2, 2	2–3	26	388, Brt.	Hl.	
26	14 15 1	240. 23	14 16 0	18. 80	2, 2	2–3	26	388, Brt.	Hl.	
Oct. 19	13 6 23	340. 50	13 4 51	23. 84	2, 2	2	26	388, Brt.	Hl.	
19	14 15 36	326. 50	14 16 41	25. 00	2, 2	2	26	388, Brt.	Hl.	Haze.
21	14 27 30	172. 51	14 27 58	25. 57	2, 2	3–4	26	388, Brt.	Hl.	
21	14 43 29	168. 69	14 42 25	25. 64	2, 2	3–4	26	388, Brt.	Hl.	
28	13 21 53	295. 90	13 24 56	61. 52	2, 2	3	26	388, Brt.	Hl.	
28	13 46 16	293. 52	13 48 22	64. 44	2, 2	3	26	388, Brt.	Hl.	Haze.
30	13 19 16	19. 06	13 22 18	46. 35	4, 4	3	26	388, Brt.	Hl.	
30	14 17 36	6. 22	14 14 44	43. 46	2, 2	3	26	388, Brt.	Hl.	
30	14 31 34	2. 43	14 29 5	43. 03	2, 2	3	26	388, Brt.	Hl.	
31	12 36 18	238. 26	12 36 20	48. 53	2, 2	3	26	388, Brt.	Hl.	
31	12 49 58	236. 93	12 50 12	47. 25	2, 2	3	26	388, Brt.	Hl.	
Nov. 2	13 28 45	61. 31	13 28 51	38. 39	2, 2	3–4	26	388, Brt.	Hl.	
2	13 47 30	60. 14	13 47 48	38. 09	2, 2	3–4	26	388, Brt.	Hl.	

SATELLITES OF SATURN

DIONE—TETHYS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	See-ing	Inst.	Power and Illum.	Obsr.	Remarks
1914	h m s	°	h m s	″			in.			
Nov. 3	14 0 58	256. 04	14 2 25	87. 92	2, 2	3	26	388, Brt.	Hl.	
3	14 16 41	255. 16	14 16 14	88. 02	2, 2	3	26	388, Brt.	Hl.	Moonlight. Haze.
4	13 1 40	89. 41	13 1 50	107. 47	2, 2	3	26	388, Brt.	Hl.	
4	13 13 50	88. 76	13 13 27	108. 01	2, 2	3	26	388, Brt.	Hl.	
6	12 44 11	123. 98	12 43 24	41. 29	2, 2	2	26	388, Brt.	Hl.	
6	13 4 34	121. 39	13 5 16	42. 32	2, 2	2	26	388, Brt.	Hl.	Moonlight.
9	13 17 22	198. 56	13 14 40	42. 40	2, 2	3	26	388, Brt.	Hl.	
9	13 35 10	194. 03	13 34 40	41. 30	2, 2	3	26	388, Brt.	Hl.	
11	12 53 40	249. 26	12 53 51	93. 94	2, 2	3	26	388, Brt.	Hl.	
13	11 46 32	285. 20	11 46 53	22. 06	2, 2	3	26	388, Brt.	Hl.	
13	11 58 52	284. 79	12 0 44	22. 00	2, 2	3	26	388, Brt.	Hl.	
16	13 51 44	293. 88	13 51 45	76. 56	2, 2	3	26	388, Brt.	Hl.	
16	14 5 59	292. 34	14 6 57	78. 59	2, 2	3	26	388, Brt.	Hl.	
17	11 47 53	172. 61	11 46 58	47. 27	2, 2	2	26	388, Brt.	Hl.	
17	12 13 29	166. 60	12 5 30	47. 26	2, 2	2	26	388, Brt.	Hl.	Haze.
Dec. 14	11 37 14	264. 53	11 36 16	16. 87	2, 2	3–4	26	388, Brt.	Hl.	
14	11 51 59	263. 42	11 53 8	17. 37	2, 2	3–4	26	388, Brt.	Hl.	
15	13 35 46	113. 65	13 35 42	48. 96	2, 2	3	26	388, Brt.	Hl.	
15	13 45 58	112. 81	13 46 10	50. 13	2, 2	3	26	388, Brt.	Hl.	
22	11 38 18	274. 08	11 39 20	95. 21	2, 2	3	26	388, Brt.	Hl.	
26	12 14 28	92. 06	12 15 18	13. 92	2, 2	3–4	26	388, Brt.	Hl.	
26	12 28 6	91. 82	12 27 49	14. 21	2, 2	3–4	26	388, Brt.	Hl.	
1915										
Jan. 13	11 44 34	229. 32	11 45 38	13. 17	2, 2	3	26	388, Brt.	Hl.	
13	11 59 57	227. 75	12 0 39	12. 90	2, 2	3	26	388, Brt.	Hl.	Rather ft. Haze.
15	11 7 6	39. 94	11 6 40	52. 60	2, 2	2	26	388, Brt.	Hl.	
15	11 21 58	38. 12	11 22 26	51. 27	2, 2	2	26	388, Brt.	Hl.	
20	12 6 10	87. 73	12 6 32	39. 88	2, 2	3	26	388, Brt.	Hl.	
20	12 19 4	87. 07	12 18 54	40. 85	2, 2	3	26	388, Brt.	Hl.	
21	11 30 20	287. 78	11 32 26	65. 87	2, 2	3	26	388, Brt.	Hl.	
21	11 47 24	286. 67	11 49 0	67. 91	2, 2	3	26	388, Brt.	Hl.	
29	8 51 26	285. 34	8 50 12	88. 11	2, 2	3	26	388, Brt.	Hl.	
29	9 3 28	284. 51	9 4 54	89. 74	2, 2	3	26	388, Brt.	Hl.	
Feb. 9	9 28 4	302. 10	9 28 18	64. 40	2, 2	3	26	388, Brt.	Hl.	
9	9 44 22	300. 05	9 44 45	66. 37	2, 2	3	26	388, Brt.	Hl.	
19	8 19 48	91. 40	8 20 54	13. 96	2, 2	2	26	388, Brt.	Hl.	
19	8 34 54	90. 36	8 35 50	14. 15	2, 2	2	26	388, Brt.	Hl.	
20	10 34 36	320. 57	10 33 32	32. 44	2, 2	2	26	388, Brt.	Hl.	
20	10 50 37	317. 85	10 49 43	33. 54	2, 2	2	26	388, Brt.	Hl.	Haze.
21	10 17 2	197. 28	10 16 40	46. 85	2, 2	3	26	388, Brt.	Hl.	
21	10 33 14	193. 51	10 32 38	46. 24	2, 2	3	26	388, Brt.	Hl.	
27	9 0 41	106. 17	9 1 24	74. 06	2, 2	2–3	26	388, Brt.	Hl.	
27	9 15 12	105. 00	9 16 1	75. 50	2, 2	2–3	26	388, Brt.	Hl.	Clouds. Moonlight.
Mar. 9	9 24 26	219. 09	9 24 33	8. 85	2, 2	3	26	388, Brt.	Hl.	
9	9 44 20	219. 93	9 44 14	8. 31	2, 2	3	26	388, Brt.	Hl.	
27	8 16 10	314. 25	8 16 23	14. 08	2, 2	2–3	26	388, Brt.	Hl.	
27	8 30 40	312. 41	8 30 54	14. 00	2, 2	2–3	26	388, Brt.	Hl.	
31	9 20 42	216. 15	9 23 40	53. 60	2, 2	2–3	26	388, Brt.	Hl.	
31	9 40 15	213. 01	9 39 26	52. 12	2, 2	2–3	26	388, Brt.	Hl.	
Apr. 1	7 26 7	69. 10	7 26 1	64. 24	2, 2	2	26	388, Brt.	Hl.	
1	7 46 4	67. 87	7 47 54	62. 40	2, 2	2	26	388, Brt.	Hl.	
7	7 52 52	329. 90	7 51 48	35. 51	2, 2	3	26	388, Brt.	Hl.	
7	8 6 27	326. 80	8 6 46	36. 01	2, 2	3	26	388, Brt.	Hl.	

SATELLITES OF SATURN

RHEA—TETHYS

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1908	h m s	°	h m s	″			in.			
Aug. 29	12 30 46	20. 84	12 30 58	11. 61	8, 8	2	26	375, Brt.	Hd.	
30	12 14 59	270. 22	12 15 4	120. 59	8, 8	1	26	375, Brt.	Hd.	
31	12 19 52	101. 10	12 20 9	44. 32	8, 8	3	26	388, Brt.	Hd.	
Sept. 1	12 56 46	98. 05	12 56 39	61. 65	8, 8	1	26	375, Brt.	Hd.	
3	11 48 52	272. 00	11 48 56	90. 57	8, 8	2	26	388, Brt.	Hd.	
6	12 23 2	80. 07	12 23 1	54. 90	8, 8	3	26	388, Brt.	Hd.	
8	11 44 58	274. 79	11 44 52	111. 23	8, 8	2	26	388, Brt.	Hd.	
9	9 36 0	135. 97	9 36 31	23. 10	8, 8	3	26	388, Brt.	Hd.	Haze. Clouded.
12	11 15 4	276. 52	11 15 7	120. 55	8, 8	1	26	388, Brt.	Hd.	
23	11 20 1	94. 86	11 19 59	40. 90	8, 8	2	26	--- Brt.	Hd.	
25	10 31 17	290. 84	10 31 11	47. 39	8, 8	1	26	--- Brt.	Hd.	Ft. Haze.
29	11 18 0	312. 33	11 18 12	16. 13	8, 8	2	26	388, Brt.	Hd.	
30	10 5 52	283. 09	10 5 56	20. 77	8, 8	2	26	388, Brt.	Hd.	
Oct. 3	10 21 36	90. 55	10 21 9	35. 85	8, 8	3	26	388, Brt.	Hd.	
4	9 52 31	70. 78	9 52 41	28. 00	8, 8	3	26	388, Brt.	Hd.	
5	9 59 24	271. 63	9 59 31	120. 98	8, 8	1	26	388, Brt.	Hd.	
1909										
Oct. 22	8 35 6	93. 50	8 45 36	127. 75	4, 4	4	26	388, Brt.	Hl.	
22	9 7 1	93. 03	8 56 49	128. 26	4, 4	4	26	388. Brt.	Hl.	
30	10 19 35	98. 99	10 31 29	48. 78	4, 4	2–3	26	388, Brt.	Hl.	
30	10 49 49	98. 57	10 39 3	48. 54	4, 4	2–3	26	388. Brt.	Hl.	
Dec. 20	10 11 57	80. 58	10 19 18	80. 74	2, 2	2	26	388, Brt.	Hl.	Moonlight.
20	10 31 20	79. 92	10 25 53	79. 74	2, 2	2	26	388, Brt.	Hl.	
1910										
Sept. 7	13 31 55	169. 83	13 32 36	19. 92	4, 4	4	26	388, Brt.	Hl.	
9	15 37 28	282. 17	15 36 30	75. 37	4, 4	3–4	26	388, Brt.	Hl.	
15	13 54 35	244. 20	13 55 3	74. 58	4, 4	3–4	26	388, Brt.	Hl.	
17	12 52 38	93. 37	12 52 40	84. 06	4, 4	3	26	388, Brt.	Hl.	
29	14 11 41	127. 36	14 11 23	22. 61	4, 4	2–3	26	388, Brt.	Hl.	
Oct. 1	13 34 16	59. 12	13 35 35	68. 97	4, 4	3	26	388, Brt.	Hl.	
Nov. 18	9 40 25	233. 45	-- -- --	-----	2, 0	3	26	388, Brt.	Hl.	Clouded.
25	10 43 27	304. 73	10 45 56	60. 34	4, 4	3	26	388, Brt.	Hl.	
26	8 54 41	258. 41	8 54 54	80. 72	4, 4	3	26	388, Brt.	Hl.	
Dec. 25	9 3 41	89. 08	9 7 59	110. 34	4, 4	3	26	388, Brt.	Hl.	
1911								459p, Brt.		
Sept. 11	14 32 58	257. 27	14 44 43	42. 03	4, 4	2–3	26	495p, Brt.	Bn.	
11	15 0 30	256. 98	14 52 13	42. 00	4, 4	2–3	26	367p, Brt.	Bn.	Objective fogged.
16	12 56 48	257. 96	13 8 54	116. 62	4, 4	4	26	367p, Brt.	Bn.	
16	13 28 36	256. 73	13 18 49	115. 92	4, 4	4	26	367p, Brt.	Bn.	
20	12 35 30	263. 73	12 48 7	111. 40	4, 4	3–4	26		Bn.	
20	13 8 59	262. 73	12 57 41	110. 70	4, 4	3–4	26	367p, Brt.	Bn.	
26	11 38 50	135. 09	11 49 8	65. 28	4, 4	3–4	26	367p, Brt.	Bn.	
26	12 4 16	131. 71	11 56 36	66. 35	4, 4	3–4	26	367p, Brt.	Bn.	
Oct. 11	15 0 23	80. 53	15 0 42	75. 75	4, 4	3	26	367p, Brt.	Bn.	
11	15 13 26	80. 18	-- -- --	-----	2, 0	3	26	367p, Brt.	Bn.	Clouded.
12	14 12 54	292. 61	14 13 29	95. 22	4, 4	2–3	26	367p, Brt.	Bn.	
12	14 31 51	291. 50	14 32 11	97. 38	4, 4	2–3	26	367p, Brt.	Bn.	Clouded.
Nov. 5	9 23 25	194. 50	9 23 40	30. 56	4, 4	2	26	495p, Brt.	Bn.	Moonlight.
5	9 40 45	191. 54	9 40 31	29. 90	4, 4	2	26	495p, Brt.	Bn.	Clouded.
16	11 38 39	87. 17	11 39 46	98. 61	4, 4	3	26	495p, Brt.	Bn.	
16	11 59 36	86. 58	11 59 36	99. 55	4, 4	3	26	495p, Brt.	Bn.	
25	9 50 25	75. 88	9 51 11	34. 39	4, 4	2–3	26	367p, Brt.	Bn.	
25	10 6 23	76. 41	10 7 7	34. 40	4, 4	2–3	26	367p, Brt.	Bn.	
Dec. 1	11 5 48	268. 19	11 7 39	69. 06	4, 4	3–4	26	367p, Brt.	Bn.	Haze.
1	11 26 9	267. 77	11 26 35	67. 81	4, 4	3–4	26	367p, Brt.	Bn.	

SATELLITES OF SATURN

RHEA—TETHYS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1912	h m s	°	h m s	"			in.			
Oct. 1	15 6 45	91. 26	15 7 40	40. 86	4, 4	3–4	26	495p, Brt.	Bn.	
2	12 47 38	83. 00	12 49 4	92. 85	4, 4	3–4	26	495p, Brt.	Bn.	
2	14 24 28	79. 85	14 25 37	95. 86	4, 4	3	26	495p, Brt.	Bn.	
5	13 13 40	221. 61	13 14 22	39. 51	4, 4	3	26	495p, Brt.	Bn.	
7	12 22 13	317. 64	12 23 10	48. 34	4, 4	4	26	495p, Brt.	Bn.	
10	13 8 0	93. 38	13 8 51	107. 63	4, 4	3	26	495p, Brt.	Bn.	
10	14 43 0	90. 13	14 44 18	105. 05	4, 4	2	26	495p, Brt.	Bn.	
16	16 43 26	327. 26	16 44 43	61. 89	4, 4	3	26	495p, Brt.	Bn.	
26	12 45 42	270. 50	12 46 36	125. 87	4, 4	4	26	367p, Brt.	Bn.	
29	13 58 3	62. 39	13 58 18	99. 50	4, 4	3	26	367p, Brt.	Bn.	
Nov. 9	14 56 58	254. 26	14 57 41	36. 52	4, 4	3	26	367p, Brt.	Bn.	
20	14 11 57	97. 81	14 13 35	120. 27	4, 4	2	26	367p, Brt.	Bn.	
22	11 39 19	271. 89	11 40 13	44. 30	4, 4	3	26	495p, Brt.	Bn.	
29	12 40 58	109. 72	12 42 47	47. 83	4, 4	4	26	495p, Brt.	Bn.	
30	11 6 56	61. 88	11 7 38	96. 36	4, 4	2	26	367p, Brt.	Bn.	
Dec. 14	9 7 32	307. 90	9 8 34	66. 12	4, 4	2	26	367p, Brt.	Bn.	
19	8 21 25	340. 34	8 21 51	40. 38	4, 4	3	26	367p, Brt.	Bn.	
27	10 33 35	20. 23	10 35 28	47. 08	4, 4	4	26	367p, Brt.	Bn.	Windy.
1913										
Jan. 4	7 47 24	138. 55	7 48 3	35. 52	4, 4	3	26	495p, Brt.	Bn.	
21	10 10 1	236. 79	10 10 46	83. 54	4, 4	3–4	26	367p, Brt.	Bn.	
30	8 25 29	258. 73	8 26 11	70. 86	4, 4	3	26	367p, Brt.	Bn.	
1914										
Sept. 28	14 31 51	228. 35	14 31 41	38. 49	2, 2	3	26	388, Brt.	Hl.	
28	15 1 43	226. 33	15 2 24	38. 80	2, 2	3	26	388, Brt.	Hl.	
Oct. 19	15 51 10	271. 46	15 54 0	119. 90	2, 2	2	26	388, Brt.	Hl.	
19	16 12 11	270. 61	16 12 37	119. 88	2, 2	2	26	388, Brt.	Hl.	
21	13 56 7	176. 60	13 55 41	38. 71	4, 4	3	26	388, Brt.	Hl.	
28	14 57 0	293. 87	14 59 23	87. 37	2, 2	3	26	388, Brt.	Hl.	
28	15 28 16	291. 68	15 40 2	92. 48	2, 2	3	26	388, Brt.	Hl.	Haze.
30	12 47 6	112. 84	12 47 22	29. 64	4, 4	3	26	388, Brt.	Hl.	
31	13 5 42	88. 46	13 6 28	105. 49	2, 2	3	26	388, Brt.	Hl.	
31	13 19 14	88. 19	13 19 11	105. 85	2, 2	3	26	388, Brt.	Hl.	
Nov. 2	14 4 24	251. 96	14 4 34	48. 01	2, 2	3	26	388, Brt.	Hl.	
2	14 17 24	251. 85	14 19 14	46. 75	2, 2	3	26	388, Brt.	Hl.	
3	13 29 38	240. 52	13 29 41	69. 47	2, 2	3	26	388, Brt.	Hl.	
3	13 44 36	239. 50	13 44 20	69. 21	2, 2	3	26	388, Brt.	Hl.	Moonlight.
4	13 26 57	93. 52	13 27 8	127. 84	2, 2	3	26	388, Brt.	Hl.	
4	13 41 13	93. 14	13 40 58	128. 07	2, 2	3	26	388, Brt.	Hl.	
5	14 14 18	349. 67	14 12 42	32. 10	2, 2	2	26	388, Brt.	Hl.	
5	14 38 59	346. 19	14 37 10	31. 80	2, 2	2	26	388, Red.	Hl.	First angle with brt. field.
9	12 44 29	88. 60	12 44 22	43. 40	2, 2	3	26	388, Brt.	Hl.	Moonlight. Haze.
9	12 58 12	88. 49	12 59 3	44. 11	2, 2	3	26	388, Brt.	Hl.	
11	12 20 52	259. 35	12 20 28	119. 59	2, 2	3	26	388, Brt.	Hl.	
11	12 36 8	258. 64	12 36 17	118. 63	2, 2	3	26	388, Brt.	Hl.	
13	13 0 45	115. 05	13 1 26	76. 68	2, 2	2	26	388, Brt.	Hl.	
13	13 16 58	113. 85	13 17 30	78. 30	2, 2	2	26	388, Brt.	Hl.	
16	13 7 20	263. 60	13 7 20	91. 25	2, 2	3	26	388, Brt.	Hl.	
16	13 34 35	262. 74	13 34 28	92. 37	2, 2	3	26	388, Brt.	Hl.	
17	13 59 9	122. 74	13 59 0	83. 85	2, 2	2–3	26	388, Brt.	Hl.	
17	14 14 8	121. 16	14 14 20	85. 79	2, 2	2–3	26	388, Brt.	Hl.	Haze.
22	13 37 49	117. 22	13 37 46	34. 17	2, 2	3	26	367b, Brt.	Hl.	
22	13 49 24	117. 27	13 49 36	35. 03	2, 2	3	26	367b, Brt.	Hl.	

SATELLITES OF SATURN

RHEA—TETHYS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1914	h m s	°	h m s	''			in.			
Dec. 15	14 2 42	96. 23	14 4 56	73. 10	2, 2	2–3	26	388, Brt.	Hl.	
15	14 17 1	95. 98	14 16 18	74. 68	2, 2	2–3	26	388, Brt.	Hl.	
21	12 57 45	302. 22	12 55 44	26. 55	2, 2	3–4	26	388, Brt.	Hl.	
21	13 13 32	303. 13	13 12 24	26. 01	2, 2	3–4	26	388, Brt.	Hl.	
26	13 38 50	267. 76	13 37 32	137. 62	2, 2	3	26	388, Brt.	Hl.	
26	13 53 54	267. 32	13 53 0	137. 87	2, 2	3	26	388, Brt.	Hl.	
1915										
Jan. 5	9 57 26	225. 07	9 57 8	83. 31	2, 2	2	26	388, Brt.	Hl.	
5	10 17 40	223. 06	10 16 48	80. 81	2, 2	2	26	388, Brt.	Hl.	Haze.
8	12 40 36	296. 57	12 40 46	93. 66	2, 2	2	26	388, Brt.	Hl.	
8	12 58 36	295. 18	13 0 20	95. 57	2, 2	2	26	388, Brt.	Hl.	Haze.
15	7 11 10	107. 60	7 14 24	99. 50	2, 2	3	26	388, Brt.	Hl.	
15	7 29 48	106. 50	7 32 5	100. 45	2, 2	3	26	388, Brt.	Hl.	
21	10 49 28	27. 94	10 49 17	70. 28	2, 2	3	26	388, Brt.	Hl.	
21	11 9 31	25. 14	11 11 22	68. 67	2, 2	3	26	388, Brt.	Hl.	
29	8 26 36	90. 09	8 25 36	40. 30	2, 2	3	26	388, Brt.	Hl.	
29	8 38 57	90. 32	8 39 42	39. 93	2, 2	3	26	388, Brt.	Hl.	
Feb. 9	9 59 50	295. 41	9 58 17	87. 36	2, 2	2–3	26	388, Brt.	Hl.	
9	10 16 34	294. 50	10 18 2	89. 71	2, 2	2–3	26	388, Brt.	Hl.	
20	11 16 54	96. 81	11 21 38	79. 14	2, 2	2–3	26	388, Brt.	Hl.	
20	11 39 24	96. 21	11 42 15	78. 67	2, 2	2–3	26	388, Brt.	Hl.	
21	10 50 26	88. 88	10 53 19	52. 32	2, 2	4	26	388, Brt.	Hl.	
21	11 8 18	88. 95	11 9 23	53. 24	2, 2	4	26	388, Brt.	Hl.	
27	9 30 58	274. 67	9 31 8	44. 50	2, 2	3–4	26	388, Brt.	Hl.	
27	9 46 26	274. 50	9 47 5	44. 10	2, 2	3–4	26	388, Brt.	Hl.	Moonlight.
Mar. 1	9 24 3	123. 97	9 19 8	79. 03	2, 2	3–4	26	388, Brt.	Hl.	
1	9 55 37	120. 96	9 54 51	82. 54	2, 2	3–4	26	388, Brt.	Hl.	Moonlight.
12	7 0 2	313. 04	6 58 45	28. 84	2, 2	3	26	388, Brt.	Hl.	
12	7 17 4	311. 81	7 15 52	28. 59	2, 2	3	26	388, Brt.	Hl.	
31	8 37 16	259. 37	8 37 38	81. 18	2, 2	2–3	26	388, Brt.	Hl.	
31	8 56 54	259. 04	8 59 10	79. 44	2, 2	2–3	26	388, Brt.	Hl.	
Apr. 1	8 10 34	249. 31	8 11 20	42. 10	2, 2	2–3	26	388, Brt.	Hl.	
1	8 28 6	249. 16	8 31 53	42. 64	2, 2	2–3	26	388, Brt.	Hl.	Tethys ft. at times. Haze.
6	9 23 26	124. 46	9 22 8	67. 74	2, 2	3–4	26	388, Brt.	Hl.	
6	9 53 44	121. 70	9 49 2	69. 76	2, 2	3–4	26	388, Brt.	Hl.	Both v. ft.
7	7 24 40	76. 57	7 23 43	41. 90	2, 2	2–3	26	388, Brt.	Hl.	
7	7 37 56	76. 19	7 37 35	41. 15	2, 2	2–3	26	388, Brt.	Hl.	

RHEA—DIONE

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1908										
Aug. 29	11 58 33	275. 06	11 58 45	61. 36	8, 8	2	26	375, Brt.	Hd.	
30	12 26 47	271. 45	12 26 47	23. 78	8, 8	1	26	375, Brt.	Hd.	
31	12 48 12	264. 13	12 48 33	42. 48	8, 8	2	26	388, Brt.	Hd.	
Sept. 1	12 35 15	97. 38	12 35 10	100. 24	8, 8	2	26	375, Brt.	Hd.	
3	11 58 53	274. 64	11 58 57	137. 44	8, 8	2	26	388, Brt.	Hd.	
6	12 32 50	90. 29	12 32 57	23. 89	8, 8	3	26	388, Brt.	Hd.	
8	11 53 37	275. 06	11 53 40	115. 04	8, 8	2	26	388, Brt.	Hd.	
12	11 44 17	270. 65	11 44 23	56. 98	8, 8	1	26	388, Brt.	Hd.	
22	11 0 47	271. 12	11 0 51	115. 88	8, 8	1	26	375, Brt.	Hd.	
29	11 38 27	88. 06	11 38 29	95. 05	8, 8	2	26	388, Brt.	Hd.	
30	10 15 5	278. 95	10 15 5	106. 54	8, 8	2	26	388, Brt.	Hd.	
Oct. 3	10 33 25	78. 14	10 33 42	20. 75	8, 8	3	26	388, Brt.	Hd.	Unsteady.
4	9 41 7	76. 89	9 41 16	8. 69	8, 8	3	26	388, Brt.	Hd.	Unsteady.
5	10 8 53	278. 51	10 8 50	60. 28	8, 8	1	26	388, Brt.	Hd.	
7	10 29 56	95. 73	10 30 9	135. 33	8, 8	1	26	388, Brt.	Hd.	
14	9 51 42	273. 97	9 51 48	145. 38	8, 8	2	26	388, Brt.	Hd.	

SATELLITES OF SATURN

RHEA—DIONE—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1909	h m s	°	h m s	″			in.			
Oct. 13	9 34 37	75. 20	9 47 52	30. 76	4, 4	4	26	388, Brt.	Hl.	
13	10 7 34	74. 29	9 55 31	30. 26	4, 4	4	26	388, Brt.	Hl.	
13	10 41 12	72. 61	10 55 23	27. 02	4, 4	4	26	388, Brt.	Hl.	
13	11 14 43	71. 56	11 3 50	26. 95	4, 4	4	26	388, Brt.	Hl.	
16	9 8 29	81. 68	9 21 29	93. 42	4, 4	3–4	26	388, Brt.	Hl.	
16	9 45 58	80. 65	9 32 47	92. 37	4, 4	3–4	26	388, Brt.	Hl.	
26	12 28 20	88. 48	12 48 7	91. 07	4, 4	3	26	388, Brt.	Hl.	
26	13 18 57	87. 88	13 5 48	90. 03	4, 4	3	26	388, Brt.	Hl.	
28	9 10 35	357. 60	9 21 31	6. 16	4, 4	4	26	388, Brt.	Hl.	
28	9 36 14	355. 14	9 27 54	6. 22	4, 4	4	26	388, Brt.	Hl.	
29	9 51 41	274. 85	10 2 13	87. 31	4, 4	3	26	388, Brt.	Hl.	
29	10 17 5	274. 66	10 8 49	87. 35	4, 4	3	26	388, Brt.	Hl.	
Dec. 20	8 39 11	77. 32	8 48 40	66. 93	2, 2	2	26	388, Brt.	Hl.	Moonlight.
20	9 0 24	76. 46	8 52 33	66. 59	2, 2	2	26	388, Brt.	Hl.	
1910										
Sept. 7	12 46 33	166. 95	12 47 23	36. 33	4, 4	4	26	388, Brt.	Hl.	
15	14 25 59	255. 67	14 25 59	113. 92	4, 4	4	26	388, Brt.	Hl.	
16	15 25 39	101. 95	15 24 32	118. 33	4, 4	3	26	388, Brt.	Hl.	
28	12 28 27	280. 08	12 28 31	110. 50	4, 4	3–4	26	388, Brt.	Hl.	
Oct. 1	11 12 34	11. 11	11 13 15	33. 25	4, 4	3	26	388, Brt.	Hl.	
5	10 48 28	95. 70	10 49 7	120. 48	4, 4	3	26	388, Brt.	Hl.	
10	11 47 45	84. 16	11 48 16	28. 88	4, 4	3–4	26	388, Brt.	Hl.	
11	11 42 43	3. 26	11 44 5	24. 52	4, 4	4	26	388, Brt.	Hl.	
Nov. 18	8 21 14	124. 81	8 21 50	62. 04	4, 4	3	26	388, Brt.	Hl.	
19	11 6 53	77. 01	11 10 4	71. 01	4, 4	3–4	26	388, Brt.	Hl.	
26	9 21 52	250. 18	9 22 23	57. 69	4, 4	3	26	388, Brt.	Hl.	
Dec. 13	10 2 37	46. 77	10 4 15	37. 90	4, 4	3–4	26	388, Brt.	Hl.	
1911										
Sept. 13	15 32 3	81. 65	15 47 44	102. 11	4, 4	4	26	495p, Brt.	Hl.	
13	16 7 45	80. 57	15 57 53	101. 74	4, 4	4	26	495p, Brt.	Hl.	
26	12 23 48	117. 45	12 37 46	91. 76	4, 4	3–4	26	367p, Brt.	Hl.	
26	12 58 17	115. 57	12 48 11	92. 93	4, 4	3–4	26	367p, Brt.	Hl.	
Oct. 11	11 22 36	29. 00	11 22 49	45. 73	4, 4	4	26	495p, Brt.	Hl.	Moonlight.
11	11 58 51	23. 63	11 59 35	43. 23	4, 4	4	26	495p, Brt.	Hl.	
13	15 24 42	269. 88	15 21 9	36. 06	4, 4	2	26	367p, Red.	Hl.	Ft. Haze.
18	12 47 41	145. 72	12 48 20	44. 07	4, 4	3	26	367p, Brt.	Hl.	
18	13 19 30	141. 41	13 19 38	45. 58	4, 4	3	26	367p, Brt.	Hl.	
23	11 46 20	157. 32	11 45 2	58. 40	4, 4	4	26	367p, Brt.	Hl.	
23	12 15 4	152. 86	12 15 50	60. 34	4, 4	4	26	367p, Brt.	Hl.	
29	12 43 21	81. 30	12 45 1	128. 25	4, 4	3–4	26	367p, Brt.	Hl.	
29	13 20 1	80. 23	13 22 31	127. 06	4, 4	3–4	26	367p, Brt.	Hl.	
Nov. 21	10 21 29	355. 20	10 20 40	48. 91	4, 4	3	26	367p, Brt.	Hl.	
21	10 51 42	349. 23	10 49 56	49. 03	4, 4	3	26	367p, Brt.	Hl.	
30	11 10 57	317. 90	11 9 47	15. 87	4, 4	3–4	26	367p, Brt.	Hl.	
30	11 39 24	315. 10	11 51 53	15. 33	2, 4	3–4	26	367p, Brt.	Hl.	Stopped by haze.
Dec. 17	9 23 51	103. 98	9 25 2	115. 30	4, 4	3	26	367p, Brt.	Hl.	
17	10 9 24	102. 28	10 12 11	120. 08	4, 4	3	26	367p, Brt.	Hl.	
1914										
Oct. 18	15 57 35	1. 88	15 57 14	59. 92	4, 4	3	26	388, Brt.	Hl.	
21	13 22 14	170. 09	13 20 1	13. 15	4, 4	3	26	388, Brt.	Hl.	
31	12 5 58	80. 51	12 5 22	146. 60	4, 4	3	26	388, Brt.	Hl.	
Nov. 2	11 49 55	251. 51	11 50 15	95. 50	2, 2	3	26	388, Brt.	Hl.	
2	12 4 10	250. 76	12 4 42	94. 63	2, 2	3	26	388, Brt.	Hl.	
3	12 40 56	123. 02	12 40 46	30. 73	2, 2	3–4	26	388, Brt.	Hl.	
3	12 52 48	121. 77	12 51 50	30. 43	2, 2	3–4	26	388, Brt.	Hl.	
4	12 35 53	122. 78	12 36 6	20. 73	2, 2	2–3	26	388, Brt.	Hl.	
4	12 47 24	122. 22	12 47 14	21. 33	2, 2	2–3	26	388, Brt.	Hl.	
5	12 58 33	78. 46	12 59 10	87. 30	2, 2	2	26	388, Brt.	Hl.	

SATELLITES OF SATURN

RHEA—DIONE—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	See-ing	Inst.	Power and Illum.	Obsr.	Remarks
1914	h m s	°	h m s	"			in.			
Nov. 5	13 10 36	78. 25	13 12 10	86. 92	2, 2	2	26	388, Brt.	Hl.	Haze.
6	13 29 37	311. 56	13 28 52	73. 10	2, 2	2	26	388, Brt.	Hl.	
6	13 50 14	309. 64	13 48 57	75. 13	2, 2	2	26	388, Brt.	Hl.	
9	12 12 12	58. 35	12 12 46	76. 62	2, 2	3	26	388, Brt.	Hl.	
9	12 30 9	57. 37	12 29 16	75. 14	2, 2	3	26	388, Brt.	Hl.	
11	14 9 48	287. 64	14 10 22	31. 08	2, 2	2	26	388, Brt.	Hl.	
11	14 23 45	287. 04	14 22 46	31. 61	2, 2	2	26	388, Brt.	Hl.	
13	12 20 39	114. 70	12 22 32	93. 26	2, 2	3	26	388, Brt.	Hl.	
13	12 40 8	113. 60	12 41 4	95. 26	2, 2	3	26	388, Brt.	Hl.	
17	11 10 26	98. 89	11 11 34	42. 67	2, 2	2	26	388, Brt.	Hl.	
17	11 23 34	98. 84	11 23 45	42. 50	2, 2	2	26	388, Brt.	Hl.	Haze.
21	12 58 6	214. 06	12 56 56	82. 48	2, 2	2	26	495, Brt.	Hl.	
21	13 18 17	211. 60	13 20 0	80. 50	2, 2	2	26	495, Brt.	Hl.	
23	10 43 24	14. 88	10 43 55	47. 31	2, 2	2	26	367b, Brt.	Hl.	
23	11 2 13	12. 85	10 59 7	46. 74	2, 2	2	26	367b, Brt.	Hl.	
Dec. 14	9 53 10	107. 93	9 53 52	74. 77	2, 2	3	26	388, Brt.	Hl.	Unsteady.
14	10 8 55	107. 49	10 9 34	75. 02	2, 2	3	26	388, Brt.	Hl.	Unsteady.
15	13 8 42	66. 09	13 8 0	28. 22	2, 2	3	26	388, Brt.	Hl.	
15	13 19 54	66. 81	13 20 47	27. 76	2, 2	3	26	388, Brt.	Hl.	
16	15 38 56	57. 35	15 38 54	45. 44	2, 2	3	26	388, Brt.	Hl.	Unsteady.
16	15 50 23	57. 53	15 50 14	45. 19	2, 2	3	26	388, Brt.	Hl.	Unsteady.
17	11 28 13	300. 27	11 28 28	68. 56	2, 2	2	26	388, Brt.	Hl.	
17	11 46 27	298. 99	11 48 32	70. 69	2, 2	2	26	388, Brt.	Hl.	Haze. Clouds.
22	10 7 14	237. 03	10 5 32	26. 26	2, 2	3	26	388, Brt.	Hl.	
22	10 25 28	237. 13	10 26 18	25. 63	2, 2	3	26	388, Brt.	Hl.	
1915										
Jan. 2	12 4 54	82. 52	12 4 2	153. 39	2, 2	3	26	388, Brt.	Hl.	
2	12 28 34	81. 63	12 31 32	152. 67	2, 2	3	26	388, Brt.	Hl.	
8	11 57 54	329. 47	11 55 22	71. 38	2, 2	2	26	388, Brt.	Hl.	
8	12 19 46	326. 54	12 19 6	73. 36	2, 2	2	26	388, Brt.	Hl.	Clds. Haze.
9	10 14 28	257. 19	10 15 32	148. 39	2, 2	2	26	388, Brt.	Hl.	
9	11 27 24	254. 72	11 25 52	144. 86	2, 2	2	26	388, Brt.	Hl.	
9	11 44 31	254. 15	11 44 5	143. 50	2, 2	2	26	388, Brt.	Hl.	
13	11 8 44	321. 35	11 9 17	31. 92	2, 2	2–3	26	388, Brt.	Hl.	
13	11 22 0	320. 32	11 21 4	32. 49	2, 2	2–3	26	388, Brt.	Hl.	
15	11 41 36	122. 02	11 43 12	94. 04	2, 2	2–3	26	388, Brt.	Hl.	
15	11 59 4	120. 76	12 0 52	95. 94	2, 2	2–3	26	388, Brt.	Hl.	
28	11 1 50	230. 63	11 2 36	79. 03	2, 2	3–4	26	388, Brt.	Hl.	
28	11 16 42	229. 52	11 16 35	78. 07	2, 2	3–4	26	388, Brt.	Hl.	
Feb. 9	10 31 32	287. 38	10 31 30	19. 80	2, 2	2–3	26	388, Brt.	Hl.	
9	10 44 14	287. 74	10 43 42	20. 18	2, 2	2–3	26	388, Brt.	Hl.	
10	9 32 40	267. 38	9 33 7	67. 64	2, 2	2	26	388, Brt.	Hl.	
10	9 50 42	266. 88	9 52 48	68. 39	2, 2	2	26	388, Brt.	Hl.	
18	8 27 34	327. 69	8 28 38	57. 56	2, 2	2–3	26	388, Brt.	Hl.	
18	8 45 36	325. 50	8 45 36	58. 98	2, 2	2–3	26	388, Brt.	Hl.	
Mar. 1	7 35 38	97. 64	7 34 56	56. 39	2, 2	2–3	26	388, Brt.	Hl.	
1	7 52 3	96. 92	7 55 13	56. 48	2, 2	2–3	26	388, Brt.	Hl.	Moonlight.
9	8 53 35	262. 08	8 54 18	25. 97	2, 2	3	26	388, Brt.	Hl.	
9	9 8 9	261. 94	9 8 28	26. 72	2, 2	3	26	388, Brt.	Hl.	
13	7 15 44	266. 34	7 15 50	134. 10	2, 2	2	26	388, Brt.	Hl.	
13	7 32 4	265. 92	7 30 18	134. 20	2, 2	2	26	388, Brt.	Hl.	
18	8 17 10	265. 94	8 16 52	117. 25	2, 2	2	26	388, Brt.	Hl.	
18	8 32 31	265. 26	8 35 52	118. 19	2, 2	2	26	388, Brt.	Hl.	
Apr. 6	8 36 0	226. 20	8 35 24	20. 64	2, 2	3	26	388, Brt.	Hl.	
6	8 51 28	224. 86	8 50 28	21. 17	2, 2	3	26	388, Brt.	Hl.	

SATELLITES OF SATURN

TITAN—RHEA

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1908	h m s	°	h m s	″			in.			
Aug. 29	12 40 9	99. 730	12 44 30	200. 92	4, 8	2	26	375, Brt.	Hd.	Electricity cut off 18 minutes.
30	12 38 9	93. 595	12 38 14	273. 86	8, 8	1	26	375, Brt.	Hd.	
31	12 58 50	89. 014	12 58 50	188. 01	8, 8	2	26	388, Brt.	Hd.	
Sept. 1	13 9 30	85. 875	13 9 23	94. 65	8, 8	1	26	375, Brt.	Hd.	
3	12 9 51	85. 753	12 10 2	145. 90	8, 8	2	26	388, Brt.	Hd.	
8	12 8 21	272. 899	12 8 37	108. 03	8, 8	2	26	388, Brt.	Hd.	
12	11 4 41	107. 549	11 4 50	108. 73	8, 8	1	26	388, Brt.	Hd.	
22	10 48 33	285. 867	10 48 30	91. 86	8, 8	1	26	388, Brt.	Hd.	
29	11 49 57	110. 364	11 50 3	86. 00	8, 8	2	26	388, Brt.	Hd.	
30	10 43 18	97. 260	10 43 18	237. 51	8, 8	2	26	388, Brt.	Hd.	
Oct. 3	10 45 39	88. 982	10 45 47	98. 56	8, 8	4	26	388, Brt.	Hd.	
5	10 20 20	85. 471	10 20 27	145. 77	8, 8	1	26	388, Brt.	Hd.	
7	10 18 14	279. 743	10 18 29	175. 62	8, 8	1	26	388, Brt.	Hd.	
14	10 2 2	101. 451	10 2 5	131. 03	8, 8	2	26	388, Brt.	Hd.	
17	10 0 11	97. 094	10 0 30	153. 84	8, 8	2	26	388, Brt.	Hd.	
1909										
Oct. 20	8 37 29	90. 181	8 58 22	284. 36	4, 4	2–3	26	388, Brt.	Hl.	
20	9 40 46	89. 834	9 18 46	283. 75	4, 4	2–3	26	388, Brt.	Hl.	
25	8 48 32	323. 430	9 0 7	65. 20	4, 4	3	26	388, Brt.	Hl.	
25	9 25 43	320. 443	9 10 56	66. 11	4, 4	3	26	388, Brt.	Hl.	
25	10 45 10	314. 405	10 52 54	75. 44	4, 4	3	26	388, Brt.	Ep.	
25	11 4 1	313. 135	10 57 45	75. 78	4, 4	3	26	388, Brt.	Ep.	
26	8 39 36	281. 546	8 59 39	216. 54	4, 4	3	26	388, Brt.	Hl.	Moonlight.
26	9 35 33	281. 056	9 18 24	217. 95	4, 4	3	26	388, Brt.	Hl.	
26	9 58 17	280. 811	10 20 37	222. 63	4, 4	3	26	388, Brt.	Hl.	
26	10 56 34	280. 388	10 38 5	224. 04	4, 4	3	26	388, Brt.	Hl.	
27	9 48 47	272. 030	9 53 49	241. 73	4, 4	3	26	388, Brt.	Ep.	
27	10 3 36	271. 946	9 58 12	241. 39	4, 4	3	26	388, Brt.	Ep.	
27	10 9 54	271. 933	10 15 42	240. 70	4, 4	3	26	388, Brt.	Ep.	
27	10 28 55	271. 790	10 21 30	240. 50	4, 4	3	26	388, Brt.	Ep.	
27	10 39 43	271. 762	10 49 58	239. 17	4, 4	3	26	388, Brt.	Hl.	
27	11 11 30	271. 580	10 59 9	238. 57	4, 4	3	26	388, Brt.	Hl.	Clouded. Blk. wires in moonlight for *p*.
29	8 8 38	265. 528	8 15 14	95. 38	4, 4	3	26	288, Brt.	Ep.	
29	8 26 22	265. 702	8 20 49	95. 73	4, 4	3	26	388, Brt.	Ep.	
29	8 41 25	265. 762	8 47 40	95. 88	4, 4	2	26	388, Brt.	Ep.	
29	8 57 35	265. 785	8 52 37	95. 88	4, 4	2	26	388, Brt.	Ep.	
29	11 38 50	266. 295	11 47 43	98. 50	4, 4	3	26	388, Brt.	Hl.	
29	12 4 48	266. 456	11 56 45	98. 46	4, 4	3	26	388, Brt.	Hl.	
29	12 20 10	266. 446	12 34 41	99. 37	4, 4	3	26	388, Brt.	Hl.	
29	12 59 29	266. 605	12 48 13	99. 57	4, 4	3	26	388, Brt.	Hl.	Moonlight.
30	8 7 50	266. 977	8 23 56	145. 24	4, 4	3	26	388, Brt.	Hl.	
30	8 47 11	266. 873	8 35 52	145. 78	4, 4	3	26	388, Brt.	Hl.	
31	8 46 46	257. 253	8 59 54	144. 40	4, 4	3	26	388, Brt.	Hl.	
31	9 18 3	256. 760	9 7 41	143. 61	4, 4	3	26	388, Brt.	Hl.	
31	9 33 45	256. 582	9 47 49	141. 80	4, 4	3	26	388, Brt.	Hl.	
31	10 10 59	256. 050	9 59 59	140. 96	4, 4	3	26	388, Brt.	Hl.	
31	10 30 46	255. 688	10 38 29	138. 79	4, 4	3	26	360b, Brt.	Ep.	
31	10 48 44	255. 440	10 43 58	138. 37	4, 4	3	26	360b, Brt.	Ep.	
Nov. 4	8 51 13	92. 746	8 57 50	126. 52	4, 4	3	26	388, Brt.	Ep.	
4	9 10 7	92. 825	9 3 26	126. 61	4, 4	3	26	388, Brt.	Ep.	
4	9 41 55	92. 777	9 53 44	125. 02	4, 4	3	26	388, Brt.	Hl.	
4	10 7 26	92. 907	10 0 46	124. 76	4, 4	3	26	388, Brt.	Hl.	
6	9 4 11	91. 243	9 18 23	233. 25	4, 4	3–4	26	388, Brt.	Hl.	
6	9 43 34	91. 044	9 32 30	233. 67	4, 4	3–4	26	388, Brt.	Hl.	
6	10 12 37	90. 935	10 22 10	235. 70	4, 4	3–4	26	388, Brt.	Ep.	
6	10 36 47	90. 833	10 29 19	235. 75	4, 4	3–4	26	388, Brt.	Ep.	

SATELLITES OF SATURN

TITAN—RHEA—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1909	h m s	°	h m s	″			in.			
Nov. 16	10 34 45	129. 975	10 46 58	46. 50	4, 4	4	26	388, Brt.	Hl.	Clds.
16	11 9 1	128. 943	10 58 5	46. 50	4, 4	4	26	388, Brt.	Hl.	
18	7 58 59	152. 567	8 9 43	35. 08	4, 4	4	26	388, Brt.	Ep.	
18	8 20 23	151. 696	8 15 32	35. 17	4, 4	4	26	388, Brt.	Ep.	
18	8 45 9	150. 184	8 53 35	36. 36	4, 4	4	26	388, Brt.	Hl.	
18	9 6 21	149. 089	8 58 0	36. 42	4, 4	4	26	388, Brt.	Hl.	
Dec. 4	11 0 52	99. 086	11 23 8	191. 22	4, 4	4	26	388, Brt.	Hl.	
4	11 46 41	98. 786	11 35 10	191. 43	4, 4	4	26	388, Brt.	Hl.	
6	8 20 58	95. 610	8 33 45	109. 73	4, 4	3	26	388, Brt.	Hl.	
6	8 58 25	95. 691	8 46 20	109. 68	4, 4	3	26	388, Brt.	Hl.	
8	8 13 40	89. 911	8 27 28	245. 94	4, 4	4	26	388, Brt.	Hl.	
8	8 48 18	89. 736	8 37 56	246. 01	4, 4	4	26	388, Brt.	Hl.	
17	8 47 38	223. 458	9 2 41	45. 08	4, 4	4	26	388, Brt.	Hl.	Too poor to continue.
20	10 40 47	128. 667	10 52 32	60. 34	4, 4	3	26	388, Brt.	Hl.	Moonlight.
20	11 11 29	127. 413	10 59 52	61. 01	4, 4	3	26	388, Brt.	Hl.	
21	8 2 21	102. 395	8 16 38	186. 96	4, 4	3	26	388, Brt.	Hl.	Moonlight.
21	8 44 37	101. 968	8 34 9	188. 38	4, 4	3	26	388, Brt.	Hl.	
21	9 10 43	101. 802	9 12 54	192. 33	4, 4	3–4	26	388, Brt.	Hl.	Clouded.
1910										
Sept. 7	13 59 29	37. 912	14 0 7	89. 74	4, 4	4	26	388, Brt.	Hl.	
7	14 36 40	36. 025	14 36 6	86. 84	4, 4	4	26	388, Brt.	Hl.	
9	13 28 24	330. 810	13 29 13	37. 43	4, 4	3–4	26	388, Brt.	Hl.	
9	14 6 2	332. 289	14 5 41	37. 00	4, 4	3–4	26	388, Brt.	Hl.	
15	12 36 21	214. 171	12 36 5	43. 56	4, 4	3–4	26	388, Brt.	Hl.	
16	14 0 8	237. 087	14 2 17	71. 29	4, 4	3	26	388, Brt.	Hl.	
16	14 39 57	236. 856	14 41 47	72. 02	4, 4	3	26	388, Brt.	Hl.	
20	13 4 28	85. 387	13 5 51	217. 06	4, 4	3	26	388, Brt.	Hl.	Moonlight.
20	13 49 2	85. 044	13 52 2	213. 48	4, 4	3	26	388, Brt.	Hl.	
22	13 11 4	83. 737	13 11 38	123. 53	4, 4	3	26	388, Brt.	Hl.	Clds.
26	15 2 1	279. 688	15 2 25	205. 22	4, 4	2–3	26	388, Brt.	Hl.	
28	12 1 29	272. 220	12 2 6	108. 24	4, 4	3–4	26	388, Brt.	Hl.	
Oct. 1	10 16 57	244. 157	10 18 57	163. 59	4, 4	3–4	26	388, Brt.	Hl.	
5	10 20 24	108. 993	10 22 45	101. 85	4, 4	3	26	388, Brt.	Hl.	
10	10 33 1	327. 049	10 34 49	47. 28	4, 4	3–4	26	388, Brt.	Hl.	
11	10 55 20	9. 945	10 56 8	37. 17	4, 4	4	26	388, Brt.	Hl.	
12	11 20 19	321. 130	11 27 38	75. 34	4, 4	3	26	388, Brt.	Hl.	
16	10 24 18	234. 331	10 26 9	77. 01	4, 4	3–4	26	388, Brt.	Hl.	Windy.
17	12 45 54	240. 373	12 47 58	60. 10	4, 4	2	26	388, Brt.	Hl.	
18	10 38 51	240. 714	10 41 32	90. 55	4, 4	2	26	388, Brt.	Hl.	Moonlight.
20	11 58 45	107. 593	12 1 51	211. 71	4, 4	3–4	26	388, Brt.	Hl.	Moonlight.
20	12 46 1	106. 928	12 45 39	215. 38	4, 4	3–4	26	388, Brt.	Hl.	
Nov. 17	8 30 5	238. 323	8 31 46	63. 92	4, 4	4	26	388, Brt.	Hl.	Clouded.
26	9 55 55	72. 568	9 57 18	178. 53	4, 4	3	26	388, Brt.	Hl.	
Dec. 9	9 52 17	92. 750	9 52 3	277. 89	4, 4	2–3	26	388, Brt.	Hl.	
13	9 5 30	45. 679	9 6 41	43. 25	4, 4	3	26	388, Brt.	Hl.	
21	8 6 39	226. 111	8 8 13	85. 39	4, 4	3	26	388, Brt.	Hl.	
27	8 33 2	84. 377	8 35 45	204. 52	4, 4	2	26	388, Brt.	Hl.	
29	7 50 43	333. 456	7 50 28	78. 98	4, 4	3–4	26	388, Brt.	Hl.	Clouded.
30	7 24 58	286. 063	7 26 41	153. 42	4, 4	3	26	388, Brt.	Hl.	
1911										
Jan. 10	8 24 46	90. 555	8 24 58	272. 97	4, 4	2–3	26	388, Brt.	Hl.	Haze. Clds.
16	7 55 57	288. 814	8 0 29	172. 27	4, 4	2–3	26	388, Brt.	Hl.	
Sept. 11	13 6 50	44. 636	13 25 31	99. 10	4, 4	3	26	495p, Brt.	Hl.	Moonlight. Misty.
11	13 57 44	42. 917	13 38 23	98. 93	4, 4	3	26	495p, Brt.	Hl.	
12	13 1 47	322. 662	13 14 43	115. 52	4, 4	4	26	495p, Brt.	Hl.	Moonlight.
12	13 35 49	324. 021	13 24 55	116. 66	4, 4	4	26	495p, Brt.	Hl.	Clds. Probably p should be decreased 3°.
16	15 0 57	257. 157	15 13 33	99. 55	4, 4	4	26	367p, Brt.	Hl.	

SATELLITES OF SATURN

TITAN—RHEA—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1911	h m s	°	h m s	″			in.			
Sept. 16	15 33 56	257. 208	15 23 37	99. 28	4, 4	4	26	367p, Brt.	Hl.	
30	13 6 48	284. 317	13 26 19	170. 81	4, 4	3	26	495p, Brt.	Hl.	
30	13 55 7	283. 837	13 41 57	172. 05	4, 4	3	26	495p, Brt.	Hl.	
Oct. 4	15 30 18	142. 602	15 31 17	67. 17	4, 4	4	26	495p, Brt.	Hl.	Windy.
4	15 52 49	142. 419	15 52 6	66. 89	4, 4	4	26	495p, Brt.	Hl.	
11	12 35 43	61. 394	12 35 52	76. 59	4, 4	3–4	26	495p, Brt.	Hl.	Clds.
11	13 19 36	61. 983	13 19 11	77. 04	4, 4	3–4	26	495p, Brt.	Hl.	
13	13 41 21	26. 672	13 41 50	99. 81	4, 4	2–3	26	495p, Brt.	Hl.	Rhea ft. Haze.
13	14 20 16	24. 497	14 20 30	98. 88	4, 4	2–3	26	495p, Brt.	Hl.	
16	10 54 27	264. 421	10 56 29	209. 21	4, 4	2	26	367p, Brt.	Hl.	Eyepiece moved hard.
16	11 33 15	264. 049	11 36 34	206. 19	4, 4	2	26	367p, Brt.	Hl.	Foggy.
18	10 37 20	262. 064	10 37 36	122. 25	4, 4	3	26	367p, Brt.	Hl.	
18	11 10 26	262. 227	11 11 23	123. 87	4, 4	3	26	367p, Brt.	Hl.	
26	13 19 29	81. 812	13 18 5	264. 70	4, 4	2	26	367p, Brt.	Hl.	
26	13 56 49	81. 428	13 56 44	264. 48	4, 4	2	26	367p, Brt.	Hl.	
Nov. 1	14 48 55	278. 229	14 47 1	232. 51	4, 4	3	26	367p, Brt.	Hl.	Clds. Cooling off.
2	9 46 50	266. 578	9 46 26	285. 11	4, 4	3	26	367p, Brt.	Hl.	
2	10 21 3	266. 173	10 20 21	285. 26	4, 4	3	26	367p, Brt.	Hl.	
13	10 49 30	64. 664	10 49 54	137. 06	4, 4	2–3	26	367p, Brt.	Hl.	Thick haze.
13	11 33 45	63. 957	11 36 8	136. 99	4, 4	2–3	26	367p, Brt.	Hl.	Sats. went out.
18	10 41 46	261. 758	10 40 49	108. 02	4, 4	4	26	367p, Brt.	Hl.	
18	11 17 41	262. 028	11 17 47	107. 95	4, 4	4	26	367p, Brt.	Hl.	
22	14 28 25	115. 418	14 32 34	176. 35	4, 4	2–3	26	367p, Brt.	Hl.	
22	15 2 30	114. 661	15 3 59	177. 92	4, 4	2–3	26	367p, Brt.	Hl.	
25	10 49 30	100. 299	10 51 49	135. 15	4, 4	2–3	26	367p, Brt.	Hl.	
25	11 31 1	100. 251	11 30 51	137. 25	4, 4	2–3	26	367p, Brt.	Hl.	
Dec. 7	10 22 28	187. 181	10 21 47	41. 14	4, 4	2	26	495p, Brt.	Hl.	Bright moonlight.
7	10 58 14	188. 558	10 57 16	41. 28	4, 4	2	26	495p, Brt.	Hl.	
8	11 17 46	194. 185	11 17 16	63. 54	4, 4	2–3	26	367p, Brt.	Hl.	Moonlight.
8	11 53 27	192. 936	11 54 59	63. 94	4, 4	2–3	26	367p, Brt.	Hl.	Clouded.
10	10 34 36	100. 371	10 38 31	262. 15	4, 4	2	26	367p, Brt.	Hl.	
10	11 23 57	99. 748	11 28 8	265. 11	4, 4	2	26	367p, Brt.	Hl.	
18	9 46 26	270. 725	9 46 6	213. 73	4, 4	3	26	367p, Brt.	Hl.	
18	10 25 54	270. 309	10 25 43	211. 28	4, 4	3	26	367p, Brt.	Hl.	
1912										
Jan. 10	7 36 36	121. 049	7 39 25	151. 66	4, 4	3	26	367p, Brt.	Hl.	
10	8 14 23	120. 036	8 14 28	154. 95	4, 4	3	26	367p, Brt.	Hl.	
19	7 27 1	269. 474	7 30 45	173. 01	4, 4	3	26	367p, Brt.	Hl.	
19	8 5 23	269. 222	8 11 5	170. 76	4, 4	3	26	367p, Brt.	Hl.	
20	8 51 6	267. 186	8 54 32	104. 67	4, 4	2	26	367p, Brt.	Hl.	
20	9 26 58	267. 360	9 26 56	104. 07	4, 4	2	26	367p, Brt.	Hl.	
24	7 40 9	153. 872	7 42 37	99. 08	4, 4	3–4	26	367p, Brt.	Hl.	Windy.
24	8 23 58	151. 188	8 24 55	100. 56	4, 4	3–4	26	367p, Brt.	Hl.	
27	7 37 9	107. 196	7 39 29	97. 21	4, 4	3	26	367p, Brt.	Hl.	
27	8 15 4	107. 330	8 15 47	98. 54	4, 4	3	26	367p, Brt.	Hl.	
1913										
Oct. 4	14 36 29	256. 425	14 37 32	153. 47	4, 4	3–4	26	367p, Brt.	Hl.	Windy. Poor obsn.
4	15 22 31	256. 069	15 23 22	150. 91	4, 4	3–4	26	367p, Brt.	Hl.	Clock running slow.
14	13 2 2	73. 754	13 5 30	259. 45	4, 4	3	26	367b, Brt.	Hl.	Brt. moonlight.
14	13 53 28	72. 953	13 53 36	257. 58	4, 4	3	26	367b, Brt.	Hl.	
26	14 14 39	133. 749	14 14 35	145. 79	4, 5	2	26	388, Brt.	Hl.	
26	14 41 6	132. 801	14 40 48	147. 86	4, 4	2	26	388, Brt.	Hl.	
28	11 56 34	83. 689	11 57 48	267. 88	4, 4	3	26	388, Brt.	Hl.	Unsteady.
28	12 50 42	83. 077	12 47 58	265. 59	4, 4	3	26	388, Brt.	Hl.	
29	11 58 49	67. 756	11 59 35	163. 29	4, 4	3	26	388, Brt.	Hl.	Windy.
29	12 46 36	67. 291	12 49 23	159. 55	4, 4	3	26	388, Brt.	Hl.	

SATELLITES OF SATURN

TITAN—RHEA—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1913	h m s	°	h m s	″			in.			
Oct. 31	11 58 37	70. 610	11 58 44	135. 99	4, 4	3	26	388, Brt.	Hl.	
31	12 38 31	70. 291	12 38 40	137. 81	4, 4	3	26	388, Brt.	Hl.	
Nov. 4	14 57 5	265. 750	15 0 23	209. 13	4, 4	2	26	388, Brt.	Hl.	
4	15 39 19	265. 375	15 42 46	206. 90	4, 4	2	26	388, Brt.	Hl.	
6	10 30 30	264. 148	10 34 13	123. 59	4, 4	2	26	388, Brt.	Hl.	Clock ran badly.
6	11 16 46	264. 195	11 18 35	125. 27	4, 4	2	26	388, Brt.	Hl.	
17	12 33 47	318. 326	12 36 44	94. 10	4, 4	3–4	26	367b, Brt.	Hl.	
17	13 11 58	317. 366	13 12 37	93. 65	4, 4	3–4	26	367b, Brt.	Hl.	
22	13 37 20	249. 148	13 37 9	244. 48	4, 4	3	26	367b, Brt.	Hl.	
22	14 19 47	248. 591	14 24 8	240. 66	4, 4	3	26	367b, Brt.	Hl.	
24	10 34 51	190. 198	10 34 29	64. 67	4, 4	3	26	388, Brt.	Hl.	Windy.
24	11 11 53	190. 229	11 12 13	63. 79	4, 4	3	26	388, Brt.	Hl.	
Dec. 3	10 23 36	39. 800	10 23 54	150. 49	4, 4	3	26	367b, Brt.	Hl.	V. unsteady.
3	11 6 15	38. 162	11 5 46	148. 80	4, 4	3	26	367b, Brt.	Hl.	
4	11 19 12	317. 709	11 21 20	154. 43	4, 4	3–4	26	367b, Brt.	Hl.	Windy.
4	11 52 56	316. 219	11 55 35	156. 71	4, 4	3–4	26	367b, Brt.	Hl.	
8	9 54 27	266. 938	9 56 38	157. 64	4, 4	3–4	26	388, Brt.	Hl.	Windy.
8	10 33 32	266. 839	10 32 7	159. 79	4, 4	3–4	26	388, Brt.	Hl.	
11	10 34 38	154. 229	10 33 9	134. 17	4, 4	2–3	26	367b, Brt.	Hl.	Moonlight.
11	11 6 58	152. 543	11 8 18	135. 07	4, 4	2–3	26	367b, Brt.	Hl.	
13	10 26 25	101. 377	10 28 22	119. 74	4, 4	2–3	26	388, Brt.	Hl.	Moonlight.
13	11 1 25	101. 344	11 4 0	118. 44	4, 4	2–3	26	388, Brt.	Hl.	
15	10 25 17	98. 905	10 28 19	211. 63	4, 4	2	26	367b, Brt.	Hl.	
15	10 56 57	98. 591	10 58 1	214. 15	4, 4	2	26	367b, Brt.	Hl.	
19	12 59 50	316. 852	13 1 57	73. 54	4, 4	3	26	388, Brt.	Hl.	
19	13 22 6	316. 796	13 21 26	72. 80	4, 4	3	26	388, Brt.	Hl.	
27	11 49 53	219. 528	11 49 26	99. 07	4, 4	2	26	367b, Brt.	Hl.	Haze.
27	12 24 28	218. 929	12 29 31	99. 77	4, 4	2	26	367b, Brt.	Hl.	
30	8 58 6	91. 770	9 0 34	276. 68	4, 4	2	26	367b, Brt.	Hl.	
30	9 37 35	91. 293	9 40 32	276. 33	4, 4	2	26	367b, Brt.	Hl.	
1914										
Jan. 5	9 8 48	304. 518	9 9 18	173. 65	4, 4	3–4	26	367b, Brt.	Hl.	
5	9 43 30	303. 385	9 44 5	176. 23	4, 4	2–3	26	367b, Brt.	Hl.	
8	10 3 56	269. 654	10 6 17	118. 21	4, 4	3	26	367, Brt.	Hl.	
8	10 48 21	269. 821	10 50 28	119. 66	4, 4	3	26	367, Brt.	Hl.	Moonlight, haze.
13	7 19 1	108. 259	7 18 32	146. 35	4, 4	3	26	367b, Brt.	Hl.	Clock running fast.
13	7 58 11	107. 799	8 1 16	145. 38	4, 4	3	26	367b, Brt.	Hl.	Clds.
14	8 31 20	108. 906	8 34 28	93. 74	4, 4	2	26	367, Brt.	Hl.	Haze.
22	8 7 50	312. 360	8 7 31	121. 49	4, 4	2	26	388, Brt.	Hl.	Brightness changing occasionally. Haze.
27	8 56 53	230. 270	8 59 30	79. 12	4, 4	3	26	388, Brt.	Hl.	Clds.
29	10 3 47	146. 407	9 59 42	133. 41	4, 4	3–4	26	367b, Brt.	Hl.	Too poor to continue.
Feb. 2	8 36 55	78. 491	8 40 49	111. 22	4, 4	3	26	495, Brt.	Hl.	Haze.
2	9 49 45	78. 969	9 51 28	112. 49	4, 4	2	26	388, Brt.	Hl.	Haze.
3	9 55 40	77. 303	9 58 17	172. 95	4, 4	2–3	26	367b, Brt.	Hl.	
3	11 2 25	76. 767	11 8 33	175. 73	4, 4	2–3	26	367b, Brt.	Hl.	Clds.
4	9 3 48	58. 192	9 6 56	179. 73	4, 4	2	26	367b, Brt.	Hl.	Moonlight. Haze.
4	9 42 54	57. 321	9 50 40	178. 20	3, 4	2	26	367b, Brt.	Hl.	Stopped by clds.
7	10 24 44	272. 068	10 27 20	171. 73	4, 4	2–3	26	367b, Brt.	Hl.	
17	9 3 18	90. 300	9 2 30	263. 82	4, 4	3	26	367b, Brt.	Hl.	
17	9 44 34	89. 799	9 46 39	265. 82	4, 4	3	26	367b, Brt.	Hl.	
24	9 8 1	273. 631	9 9 3	257. 88	4, 4	3	26	388, Brt.	Hl.	
24	9 41 9	273. 115	9 43 45	258. 86	4, 4	3	26	388, Brt.	Hl.	
26	8 34 51	233. 710	8 36 33	119. 85	4, 4	3	26	388, Brt.	Hl.	
26	9 8 50	233. 237	9 8 22	118. 15	4, 4	3	26	388, Brt.	Hl.	
27	9 45 45	228. 952	9 47 1	69. 64	4, 4	2	26	388, Brt.	Hl.	
27	10 4 50	229. 440	-- -- --	------	2, 0	2	26	388, Brt.	Hl.	Stopped by haze. Rhea ft.
Mar. 4	7 14 52	85. 011	7 15 58	201. 13	4, 4	3	26	388, Brt.	Hl.	

SATELLITES OF SATURN

TITAN—RHEA—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1914	h m s	°	h m s	"			in.			
Oct. 1	14 1 42	73. 528	14 4 31	207. 21	4, 4	2–3	26	388, Brt.	Hl.	
18	14 31 48	28. 100	14 33 29	53. 93	4, 4	3	26	388, Brt.	Hl.	
21	12 34 38	289. 568	12 34 47	204. 27	4, 4	3	26	388, Brt.	Hl.	
27	14 41 16	183. 608	14 43 32	123. 40	4, 4	3	26	388, Brt.	Hl.	
30	12 1 39	83. 269	12 4 2	155. 24	4, 4	3	26	388, Brt.	Hl.	
31	13 40 27	88. 534	13 40 19	119. 69	4, 4	3	26	388, Brt.	Hl.	
Nov. 2	14 42 0	67. 752	14 44 50	228. 62	4, 4	3	26	388, Brt.	Hl.	Moonlight.
3	12 17 17	33. 869	12 18 25	151. 25	4, 4	3	26	388, Brt.	Hl.	
4	12 14 30	314. 117	12 15 51	134. 97	4, 4	2–3	26	388, Brt.	Hl.	Moonlight.
5	13 31 14	281. 157	13 31 28	147. 98	4, 4	2	26	388, Brt.	Hl.	Haze.
7	11 51 25	284. 263	11 52 38	123. 46	4, 4	3–4	26	388, Brt.	Hl.	Clds.
9	11 38 18	253. 553	11 40 38	269. 38	4, 4	3	26	388, Brt.	Hl.	
13	13 42 25	157. 679	13 41 30	66. 15	2, 2	2	26	388, Brt.	Hl.	
13	13 54 43	157. 751	13 54 12	66. 79	2, 2	2	26	388, Brt.	Hl.	
16	11 9 44	80. 445	11 11 10	287. 21	4, 4	3–4	26	388, Brt.	Hl.	
20	11 26 56	36. 899	11 27 13	104. 70	4, 4	3	26	388, Brt.	Hl.	
22	11 51 38	282. 017	11 53 51	246. 14	4, 4	2–3	26	388, Brt.	Hl.	
Dec. 12	11 59 18	205. 987	11 59 23	132. 04	4, 4	2	26	388, Brt.	Hl.	Haze.
14	10 30 44	152. 474	10 30 20	57. 31	2, 2	3	26	388, Brt.	Hl.	
14	10 44 11	153. 098	10 43 54	57. 47	2, 2	3	26	388, Brt.	Hl.	
16	13 3 50	114. 413	13 3 50	189. 95	2, 2	2–3	26	388, Brt.	Hl.	
16	13 28 28	113. 807	13 27 14	192. 14	2, 2	2–3	26	388, Brt.	Hl.	
22	10 51 48	23. 179	10 51 20	113. 77	2, 2	3	26	388, Brt.	Hl.	
22	11 11 1	22. 382	11 12 1	113. 56	2, 2	3	26	388, Brt.	Hl.	
23	11 18 49	307. 095	11 16 56	168. 75	2, 2	2	26	388, Brt.	Hl.	
23	11 38 46	306. 367	11 38 12	171. 16	2, 2	2	26	388, Brt.	Hl.	Haze.
1915										
Jan. 2	11 22 4	93. 021	11 21 58	118. 11	2, 2	3	26	388, Brt.	Hl.	
2	11 43 57	93. 257	11 44 30	118. 31	2, 2	3	26	388, Brt.	Hl.	
5	11 58 39	51. 269	12 5 18	197. 79	2, 2	2	26	388, Brt.	Hl.	
5	12 23 48	50. 664	12 23 13	196. 70	2, 2	2	26	388, Brt.	Hl.	Haze.
8	13 16 56	288. 378	13 16 4	86. 53	2, 2	2	26	388, Brt.	Hl.	
8	13 33 5	288. 504	13 34 53	86. 90	2, 2	2	26	388, Brt.	Hl.	Haze.
9	12 1 22	295. 378	12 3 12	106. 48	2, 2	2	26	388, Brt.	Hl.	
9	12 17 46	295. 325	12 19 33	107. 48	2, 2	2	26	388, Brt.	Hl.	
14	8 8 34	150. 102	8 8 30	72. 07	2, 2	2	26	388, Brt.	Hl.	
14	8 24 43	150. 159	8 23 26	71. 90	2, 2	2	26	388, Brt.	Hl.	Haze. Fog.
20	11 27 18	49. 511	11 26 52	100. 16	2, 2	3	26	388, Brt.	Hl.	
20	11 44 57	49. 193	11 45 11	98. 64	2, 2	3	26	388, Brt.	Hl.	
28	9 57 2	257. 017	9 58 30	150. 17	2, 2	2–3	26	388, Brt.	Hl.	
28	10 21 13	256. 929	10 22 6	150. 77	2, 2	2–3	26	388, Brt.	Hl.	
Feb. 9	11 7 20	302. 462	11 8 22	70. 52	2, 2	2–3	26	388, Brt.	Hl.	
9	11 26 46	302. 563	11 26 20	70. 60	2, 2	2–3	26	388, Brt.	Hl.	
10	10 13 32	294. 926	10 16 16	128. 37	2, 2	2	26	388, Brt.	Hl.	
10	10 40 33	294. 467	10 39 16	130. 12	2, 4	2	26	388, Brt.	Hl.	
17	9 49 48	136. 888	9 49 48	131. 79	2, 2	2	26	388, Brt.	Hl.	
17	10 12 59	135. 929	10 12 18	133. 20	2, 2	2	26	388, Brt.	Hl.	
19	10 36 58	81. 691	10 36 22	263. 32	2, 2	2	26	388, Brt.	Hl.	
19	11 0 28	81. 448	11 0 25	261. 79	2, 2	2	26	388, Brt.	Hl.	
Mar. 1	8 19 52	257. 169	8 22 20	175. 14	2, 2	3	26	388, Brt.	Hl.	
1	8 46 23	256. 897	8 48 8	176. 06	2, 2	3	26	388, Brt.	Hl.	Moonlight.
9	7 58 14	68. 577	7 56 58	237. 08	2, 2	2	26	388, Brt.	Hl.	
9	8 30 30	68. 069	8 33 0	235. 59	2, 2	2	26	388, Brt.	Hl.	
18	9 2 38	182. 399	9 1 2	62. 19	2, 2	2	26	388, Brt.	Hl.	
18	9 15 20	182. 146	9 16 8	61. 77	2, 2	2	26	388, Brt.	Hl.	Haze.
29	8 22 54	281. 539	8 25 12	205. 66	2, 2	3	26	388, Brt.	Hl.	

SATELLITES OF SATURN

TITAN—RHEA—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1915	h m s	°	h m s	″			in.			
Mar. 29	8 48 36	281. 308	8 47 54	206. 02	2, 2	3	26	388, Brt.	Hl.	
Apr. 6	7 31 36	99. 871	7 31 52	113. 00	2, 2	2–3	26	388, Brt.	Hl.	
6	7 50 44	99. 842	7 49 16	112. 46	2, 2	2–3	26	388, Brt.	Hl.	
7	8 26 11	109. 547	8 29 9	91. 21	2, 2	2–3	26	388, Brt.	Hl.	
7	8 43 2	109. 582	8 45 27	91. 37	2, 2	2–3	26	388, Brt.	Hl.	
Oct. 25	13 55 56	262. 333	13 57 32	110. 39	4, 4	3	26	390p, Brt.	Hl.	
27	14 30 4	253. 671	14 31 0	224. 12	4, 4	4	26	390p, Brt.	Hl.	
28	15 21 51	226. 166	15 22 16	167. 44	4, 4	3	26	390p, Brt.	Hl.	Object glass fogged after this.
29	16 4 34	147. 502	16 5 36	114. 94	4, 4	3–4	26	390p, Brt.	Hl.	
Nov. 9	15 6 40	280. 023	15 9 24	220. 64	4, 4	3–4	26	390p, Brt.	Hl.	
10	12 54 31	263. 435	13 7 59	284. 02	4, 4	2–3	26	388, Brt.	Hl.	Clock running badly.
17	11 34 14	90. 482	11 32 50	259. 71	4, 4	3–4	26	390p, Brt.	Hl.	
22	13 50 18	18. 055	13 49 30	123. 07	4, 4	2	26	390p, Brt.	Hl.	
24	13 39 48	272. 654	13 43 22	206. 42	4, 4	2	26	390p, Brt.	Hl.	
27	12 7 59	264. 859	12 14 18	201. 64	4, 4	2–3	26	388, Brt.	Hl.	
30	13 4 56	137. 114	13 5 42	122. 38	4, 4	3	26	388, Brt.	Hl.	
Dec. 2	12 0 22	112. 774	11 54 57	81. 12	4, 4	3	26	388, Brt.	Hl.	Delayed by eyepiece fogging.
6	14 50 3	48. 372	14 52 30	159. 07	4, 4	2	26	388, Brt.	Hl.	
15	10 48 23	236. 082	10 55 49	92. 99	4, 4	2–3	26	388, Brt.	Hl.	Haze.
1916										
Jan. 7	10 59 35	41. 042	10 59 34	135. 40	4, 4	3–4	26	388, Brt.	Hl.	
8	10 27 38	350. 362	10 27 3	64. 67	4, 4	3	26	388, Brt.	Hl.	
13	9 18 29	255. 190	9 18 25	261. 55	4, 4	3–4	26	388, Brt.	Hl.	
18	8 21 2	139. 388	8 22 14	147. 42	4, 4	3–4	26	388, Brt.	Hl.	Clds.
26	9 57 55	283. 936	-- -- --	------	3, 0	2	26	388, Brt.	Hl.	Clouded.
Feb. 5	7 58 31	104. 712	8 8 9	200. 10	2, 3	2	26	388, Brt.	Hl.	Haze. Clds.
11	8 26 12	345. 497	8 23 6	92. 47	4, 4	3	26	388, Brt.	Hl.	Rhea v. ft. at last. Clds.
Mar. 8	8 4 59	98. 466	8 1 8	233. 42	4, 4	3	26	388, Brt.	Hl.	
16	8 47 23	262. 291	8 45 47	252. 98	4, 4	3	26	388, Brt.	Hl.	
17	9 44 13	245. 272	9 46 59	154. 24	4, 4	3	26	388, Brt.	Hl.	
25	8 39 19	89. 621	8 40 19	121. 75	4, 4	3	26	388, Brt.	Hl.	
Apr. 10	9 59 6	74. 534	10 0 40	234. 22	4, 4	2–3	26	388, Brt.	Hl.	
1925										
May 12	10 37 29	29. 939	10 33 50	61. 18	4, 4	3	26	495, Brt.	Hl.	
12	11 59 32	33. 128	11 58 7	64. 92	4, 4	3	26	520p, Brt.	Bn.	
15	9 31 33	101. 759	9 32 25	213. 45	4, 5	3–4	26	390p, Brt.	Bn.	
15	10 28 20	102. 477	10 30 40	208. 45	4, 4	3–4	26	495, Brt.	Hl.	
18	10 49 44	124. 093	10 51 1	72. 54	4, 4	3	26	495, Brt.	Hl.	Haze and clds.
18	11 47 5	124. 615	11 50 57	73. 15	4, 4	4	26	520p, Brt.	Bn.	Clds.
19	10 53 47	177. 247	10 56 0	71. 62	4, 4	3–4	26	495, Brt.	Hl.	
19	11 28 7	179. 523	11 29 27	72. 08	4, 4	3	26	520p, Brt.	Bn.	
22	9 54 30	276. 123	10 0 32	199. 03	4, 4	4	26	390p, Brt.	Bn.	
22	11 8 40	276. 686	11 13 17	193. 85	4, 4	3–4	26	367, Brt.	Hl.	
25	9 57 27	282. 863	9 55 58	168. 93	4, 4	3	26	495, Brt.	Hl.	
25	11 3 28	283. 488	11 5 51	169. 01	3, 4	3–4	26	390p, Brt.	Bn.	Clouded.
26	9 20 35	311. 679	9 23 0	116. 85	4, 4	4	26	390p, Brt.	Bn.	
26	10 3 3	313. 573	10 3 48	114. 30	4, 4	4	26	495, Brt.	Hl.	
June 2	11 0 27	127. 846	11 2 36	128. 60	4, 4	3–4	26	495, Brt.	Hl.	Moonlight and haze.
2	11 40 24	129. 434	11 41 16	125. 35	3, 4	3	26	390p, Brt.	Bn.	Clouded.
3	10 0 28	220. 089	10 1 11	99. 06	4, 4	3	26	495, Brt.	Hl.	Haze. Moon near.
4	11 40 17	254. 496	11 41 41	132. 28	4, 4	3–4	26	390p, Brt.	Bn.	
5	9 30 17	256. 151	9 34 3	90. 48	4, 4	3–4	26	495, Brt.	Hl.	
5	10 11 14	255. 935	10 12 1	89. 38	4, 4	3	26	390p, Brt.	Bn.	

SATELLITES OF SATURN

TITAN—RHEA—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1925	h m s	°	h m s	″			in.			
June 6	10 48 15	250. 697	10 49 22	108. 67	4, 4	3–4	26	390p, Brt.	Bn.	Haze.
11	9 10 51	28. 534	9 12 17	40. 64	4, 4	3–4	26	495, Brt.	Hl.	
11	9 49 31	27. 470	9 48 57	39. 95	4, 4	3–4	26	390p, Brt.	Bn.	
12	9 24 0	346. 466	9 24 20	39. 14	4, 4	3–4	26	390p, Brt.	Bn.	
12	10 0 48	346. 307	10 0 23	39. 64	4, 5	3–4	26	495, Brt.	Hl.	
16	10 25 22	107. 358	10 24 50	157. 45	4, 4	3–4	26	495, Brt.	Hl.	
18	9 23 22	118. 987	9 13 52	58. 64	4, 4	3–4	26	495, Brt.	Hl.	Clock running badly.
19	10 15 4	125. 090	10 12 14	85. 02	4, 4	4	26	390p, Brt.	Bn.	Delayed by clds.
20	9 4 27	200. 285	9 3 32	79. 73	4, 4	3–4	26	495, Brt.	Hl.	
20	9 51 8	203. 580	9 52 41	82. 28	4, 4	3–4	26	390p, Brt.	Bn.	
23	9 27 57	277. 654	9 21 1	154. 10	4, 4	3	26	390p, Brt.	Bn.	Driving clock failed.
23	10 17 32	277. 892	10 18 12	150. 72	4, 4	3–4	26	495, Brt.	Hl.	
July 1	9 11 1	82. 625	9 11 52	111. 58	4, 4	3	26	495, Brt.	Hl.	
3	9 22 37	103. 068	9 45 39	201. 33	2, 4	3	26	495, Brt.	Hl.	Clouded.
11	8 56 13	299. 230	8 57 57	125. 20	4, 4	2	26	495, Brt.	Hl.	Haze. Rhea ft. at last.
14	9 2 47	339. 157	9 5 6	49. 47	4, 4	3–4	26	390p, Brt.	Bn.	
14	9 42 21	340. 968	9 44 15	49. 87	4, 4	3–4	26	495, Brt.	Hl.	
1926										
Apr. 1	13 51 22	130. 422	13 50 7	147. 47	4, 4	3	26	367, Brt.	Hl.	Moon near.
23	11 41 27	266. 964	11 41 45	123. 83	4, 4	2–3	26	367, Brt.	Hl.	
23	12 11 57	266. 946	12 11 39	125. 29	4, 4	2	26	390p, Brt.	Bn.	
May 5	10 58 26	225. 355	10 58 46	55. 64	4, 4	3	26	390p, Brt.	Bn.	
5	12 1 33	223. 918	12 2 5	54. 31	4, 4	3	26	495, Brt.	Hl.	
11	10 46 0	313. 390	10 47 55	63. 47	4, 4	3–4	26	495, Brt.	Hl.	
11	11 35 17	312. 725	11 36 48	62. 80	4, 4	3	26	390p, Brt.	Bn.	
20	10 42 26	130. 275	10 43 8	134. 57	4, 4	3	26	390p, Brt.	Bn.	
20	11 21 44	131. 563	11 23 15	132. 80	4, 4	3–4	26	495, Brt.	Hl.	
21	10 13 36	211. 189	10 15 12	117. 88	4, 4	3	26	495, Brt.	Hl.	
21	10 53 43	213. 488	10 53 39	119. 54	4, 4	3	26	390p, Brt.	Bn.	
29	11 45 57	63. 757	11 47 11	118. 78	4, 4	4–3	26	390p, Brt.	Bn.	
29	12 30 0	64. 485	12 31 7	118. 82	4, 4	3–4	26	495, Brt.	Hl.	
June 7	9 53 26	209. 687	9 54 3	75. 68	4, 4	3–4	26	390p, Brt.	Bn.	
7	11 10 31	212. 380	11 12 5	79. 75	4, 4	4	26	495, Brt.	Hl.	
9	10 57 26	268. 853	11 3 14	270. 19	4, 4	4	26	367, Brt.	Hl.	
19	9 53 22	98. 109	9 53 13	120. 08	4, 4	3	26	495, Brt.	Hl.	
21	10 18 3	147. 669	10 18 0	113. 18	4, 4	3–4	26	390p, Brt.	Bn.	Moonlight.
28	10 9 21	305. 926	10 11 31	151. 43	4, 4	4	26	390p, Brt.	Bn.	
29	9 42 15	24. 024	9 42 3	87. 93	4, 4	4	26	390p, Brt.	Bn.	
July 7	9 30 13	204. 407	9 32 5	43. 56	4, 4	3–4	26	495, Brt.	Hl.	
7	10 11 53	203. 961	10 12 46	43. 02	4, 4	3–4	26	390p, Brt.	Bn.	
8	9 16 2	171. 421	9 17 55	49. 17	4, 4	3	26	390p, Brt.	Bn.	
8	9 48 22	171. 677	9 49 17	49. 90	4, 4	3–4	26	495, Brt.	Hl.	
9	9 41 51	222. 737	9 40 9	99. 49	4, 4	3–4	26	495, Brt.	Hl.	
12	8 54 45	286. 950	8 54 47	165. 79	4, 4	4–5	26	390p, Brt.	Bn.	
16	8 44 56	3. 441	8 45 46	89. 52	4, 4	3	26	495, Brt.	Hl.	
16	9 16 1	5. 621	9 15 34	89. 71	4, 4	3–4	26	390p, Brt.	Bn.	
20	9 34 49	96. 924	9 36 18	94. 85	4, 4	3–4	26	367, Brt.	Hl.	
21	8 41 21	97. 008	8 42 11	145. 90	4, 4	4	26	390p, Brt.	Bn.	

SATELLITES OF SATURN

HYPERION—TITAN

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1908	h m s	°	h m s	″			in.			
Aug. 29	13 23 52	90. 672	13 23 22	89. 40	4, 4	2	26	388, Red.	Hd.	
30	13 1 54	91. 268	13 2 49	70. 94	4, 4	1	26	388, Red.	Hd.	
31	13 22 15	92. 858	13 22 15	63. 16	4, 4	2	26	388, Red.	Hd.	
Sept. 1	13 30 54	94. 580	13 31 21	67. 45	4, 5	1	26	375, Red.	Hd.	
3	12 38 19	94. 077	12 38 37	98. 17	6, 6	2	26	388, Red.	Hd.	
29	12 24 26	279. 928	12 24 50	270. 71	4, 7	2	26	360, Red.	Hd.	
30	11 40 0	276. 315	11 40 10	363. 25	4, 6	2	26	360, Red.	Hd.	
Oct. 2	10 33 4	271. 919	10 33 18	406. 10	8, 10	4	26	178, Red.	Hd.	
3	11 19 23	269. 409	11 19 57	344. 59	8, 10	4	26	178, Red.	Hd.	
4	10 43 17	265. 200	10 44 18	243. 25	8, 10	3	26	178, Red.	Hd.	Hyperion ft. Moonlight.
14	10 28 51	84. 589	10 29 7	189. 79	6, 6	3	26	388, Red.	Hd.	
20	9 53 10	273. 144	9 53 49	256. 98	8, 8	3	26	178, Red.	Hd.	
1910										
Sept. 26	12 12 13	244. 844	12 12 38	125. 08	4, 4	2	26	388, Red.	Hl.	Hyperion v. ft.
27	12 41 19	220. 203	12 42 52	73. 46	4, 4	2–3	26	388, Red.	Hl.	
28	11 7 43	171. 910	11 9 1	53. 38	4, 4	3–4	26	388, Red.	Hl.	Hyperion v. ft.
Oct. 5	12 37 53	133. 760	12 39 46	34. 01	4, 4	3	26	388, Red.	Hl.	Hyperion v. ft.
1911										
Oct. 24	13 34 5	198. 894	13 36 41	56. 68	4, 4	3	26	367b, Red.	Hl.	Hyperion v. ft.
24	14 13 43	198. 150	14 17 15	56. 28	4, 4	3	26	367b, Red.	Hl.	
25	10 53 42	166. 573	10 54 56	60. 59	4, 4	2	26	367b, Red.	Hl.	
25	11 31 11	165. 562	11 34 15	61. 40	4, 4	2	26	367b, Red.	Hl.	
Dec. 6	10 10 0	86. 680	10 14 58	303. 77	4, 4	2	26	367b.	Hl.	Hyperion v. ft.
6	11 10 58	86. 264	11 7 34	302. 13	4, 4	2	26	367b.	Hl.	Bright moonlight. Haze.
7	9 14 38	79. 622	9 26 22	256. 98	3, 5	2	26	367b, Red.	Hl.	Stopped by moonlight.
1912										
Jan. 21	7 39 33	80. 482	7 46 27	366. 57	4, 4	2	26	367b, Red.	Hl.	
22	7 55 53	69. 628	7 58 26	289. 11	4, 4	3	26	367b, Red.	Hl.	
Oct. 15	15 7 54	208. 171	15 9 5	186. 55	4, 4	3	26	367b, Red.	Bn.	
15	15 42 49	207. 321	15 44 56	184. 67	4, 4	3	26	388, Red.	Bn.	
16	13 56 9	170. 053	13 59 48	156. 14	4, 4	2	26	367b, Red.	Bn.	
16	15 3 11	168. 280	15 3 46	156. 51	4, 4	2	26	367b, Red.	Bn.	
Nov. 18	14 20 29	66. 304	14 20 59	209. 27	4, 4	2	26	367b, Red.	Bn.	
20	13 44 29	7. 529	13 44 13	126. 97	4, 4	2	26	495b, Red.	Bn.	
Dec. 9	11 12 44	355. 736	11 14 14	175. 07	4, 4	3	26	367b, Red.	Bn.	
28	9 7 45	347. 339	9 8 46	69. 59	4, 4	2	26	495b, Red.	Bn.	
28	10 35 51	343. 852	10 37 19	70. 31	4, 4	3	26	495b, Red.	Bn.	
30	10 2 46	287. 961	10 3 5	129. 60	4, 4	3	26	367b, Red.	Bn.	Hyperion v. ft.
30	10 34 4	287. 719	10 34 47	130. 28	4, 4	3	26	367b, Red.	Bn.	
1913										
Jan. 4	8 19 41	254. 155	8 20 17	88. 24	4, 4	2	26	388, Red.	Bn.	
4	9 50 57	253. 889	9 52 49	87. 00	4, 4	4	26	388, Red.	Bn.	
14	10 24 33	197. 390	10 26 4	89. 63	4, 4	2	26	495b, Red.	Bn.	
Oct. 5	14 50 34	28. 335	14 51 18	143. 20	4, 4	2	26	367b, Red.	Hl.	
5	15 38 36	26. 872	15 40 11	141. 67	4, 4	2	26	367b, Red.	Hl.	
		$\Delta\alpha$		$\Delta\delta$						
		s		″						
21	13 33 39	+28. 460	-- -- --	+ 88. 41	t30, 10	2–3	26	367b, Red.	Hl.	Hyperion v. ft. Measures made by transits.
21	14 15 0	+28. 410	-- -- --	+ 89. 82	t30, 10	2–3	26	367b, Red.	Hl.	Hyperion v. ft. Measures made by transits.
22	14 25 20	+22. 738	-- -- --	+145. 60	t30, 10	2–3	26	367b, Red.	Hl.	Measures made by transits.
29	14 13 25	−32. 207	-- -- --	− 17. 30	t30, 8	3	26	367b, Red.	Hl.	Windy.

SATELLITES OF SATURN

HYPERION—TITAN—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1913	h m s	°	h m s	"			in.			
Nov. 1	15 27 41	238. 792	15 27 57	301. 31	4, 4	2–3	26	367b, Red.	Hl.	
1	16 28 4	237. 953	16 31 51	298. 27	4, 4	2–3	26	367b, Red.	Hl.	
2	11 59 40	222. 625	12 3 49	229. 07	4, 4	1	26	367b, Red.	Hl.	
2	12 54 52	221. 694	12 55 43	226. 33	4, 4	1	26	367b, Red.	Hl.	
4	12 5 36	149. 296	12 6 49	164. 59	4, 4	2	26	367b, Red.	Hl.	
4	13 4 34	147. 459	13 3 38	166. 36	4, 4	2	26	367b, Red.	Hl.	
5	11 39 59	121. 266	11 44 37	205. 45	4, 4	1–2	26	367b, Red.	Hl.	Hyperion ft. Haze.
5	12 36 15	120. 465	12 42 4	207. 54	4, 5	1–2	26	367b, Red.	Hl.	
6	12 29 31	104. 308	12 33 11	247. 28	4, 4	2	26	367b, Red.	Hl.	
6	13 30 50	103. 869	13 33 5	249. 00	4, 4	2	26	367b, Red.	Hl.	
20	10 33 6	251. 135	10 36 0	93. 49	4, 4	3	26	388, Red.	Hl.	Hyperion v. ft.
20	11 15 42	251. 198	11 15 38	92. 54	4, 4	3	26	388, Red.	Hl.	
21	9 42 44	250. 755	9 41 31	71. 60	4, 4	2	26	388, Red.	Hl.	Apparently a little fog.
21	10 11 26	250. 749	10 12 3	71. 59	4, 4	2	26	388, Red.	Hl.	
22	9 49 17	255. 012	9 50 52	63. 18	4. 4	2	26	388, Red.	Hl.	A little fog.
22	10 20 57	254. 863	10 21 42	62. 83	4, 4	2	26	388, Red.	Hl.	
24	13 26 51	261. 093	13 28 17	84. 85	4, 4	3	26	388, Red.	Hl.	
24	14 4 4	261. 268	14 5 40	85. 29	4, 4	3	26	388, Red.	Hl.	
Dec. 4	10 28 5	87. 395	10 30 16	203. 59	4, 6	3	26	367b, Red.	Hl.	Hyperion v. ft. Windy.
5	13 24 41	75. 751	13 29 5	212. 01	4, 4	2–3	26	367b, Red.	Hl.	Hyperion v. ft.
5	14 21 36	75. 375	14 23 37	210. 83	4, 4	2–3	26	367b, Red.	Hl.	
9	10 59 14	334. 161	10 58 3	150. 90	4, 4	2	26	367b, Red.	Hl.	V. ft. Moonlight.
9	11 34 13	333. 427	11 41 1	151. 73	3, 5	2	26	367b, Red.	Hl.	
9	13 50 43	329. 798	13 48 47	155. 72	4, 4	2	26	367b, Red.	Hl.	V. ft. Moonlight. Haze.
9	14 25 22	329. 109	14 25 48	157. 13	4, 4	2	26	367b, Red.	Hl.	
15	12 3 3	254. 034	12 2 59	401. 51	4, 4	2–3	26	367b, Red.	Hl.	
15	13 5 42	253. 613	13 9 36	400. 63	4, 4	2–3	26	367b, Red.	Hl.	
19	10 0 20	156. 233	10 8 8	203. 95	4, 4	2	26	367b, Red.	Hl.	
19	10 46 2	154. 879	10 45 40	205. 02	4, 4	2	26	367b, Red.	Hl.	Hyperion ft.
29	13 17 32	294. 022	13 22 15	335. 29	4, 4	2	26	367b, Red.	Hl.	
1914										
Jan. 15	10 11 11	339. 670	9 58 17	106. 86	4, 4	2–3	26	367b, Red.	Hl.	
15	11 8 27	338. 221	11 9 58	106. 98	4, 4	2–3	26	367b, Red.	Hl.	Hyperion v. ft.
17	9 42 34	289. 460	9 48 17	175. 78	4, 4	3	26	367b, Red.	Hl.	Hyperion v. ft. Windy.
29	8 49 45	250. 879	8 46 53	104. 72	4, 4	3	26	367b, Red.	Hl.	Hyperion v. ft. Too poor to continue.
Feb. 21	8 5 42	147. 881	8 4 6	197. 31	4, 4	2	26	367b, Red.	Hl.	Hyperion v. ft.
21	8 59 24	146. 406	9 3 40	199. 89	4, 4	2	26	367b, Red.	Hl.	
1915										
Oct. 29	14 32 31	250. 893	14 34 10	379. 37	4, 4	3–4	26	388, Red.	Hl.	Probably not Hyperion.
30	14 29 38	260. 693	14 36 26	148. 66	4, 7	2	26	367b, Red.	Hl.	Hyperion v. ft.
Nov. 3	15 2 29	179. 073	15 0 33	73. 32	4, 4	2–3	26	388, Red.	Hl.	
17	14 4 56	266. 742	14 3 22	426. 98	4, 4	2–3	26	388, Red.	Hl.	Hyperion ft.
Dec. 4	13 25 5	278. 977	13 22 19	372. 02	4, 5	2–3	26	388, Red.	Hl.	Delayed by eyepiece fogging.
8	13 25 35	244. 768	13 30 22	278. 77	4, 5	2–3	26	367b, Red.	Hl.	
9	12 5 38	230. 086	-- -- --	-------	2, 0	--	26		Hl.	
10	11 48 20	200. 060	11 47 14	132. 46	4, 4	2–3	26	367b, Red.	Hl.	Poor obsn. Wires fluctuating in brightness.
1916										
Jan. 3	11 26 21	250. 687	11 26 15	164. 19	4, 4	2–3	26	367b, Red.	Hl.	
8	11 21 25	106. 705	11 23 55	180. 53	4, 4	3	26	367b, Red.	Hl.	
Feb. 7	11 0 22	268. 989	11 1 20	393. 03	4, 6	3	26	388, Red.	Hl.	First two angles with 367b.
Mar. 8	8 59 29	60. 414	9 25 36	113. 00	2, 4	2–3	26	388, Red.	Hl.	Clds.
10	9 46 0	166. 201	9 45 56	92. 16	4, 4	3	26	388, Red.	Hl.	Windy.
23	8 34 0	273. 434	8 31 16	394. 94	4, 6	2–3	26	388, Red.	Hl.	

SATELLITES OF SATURN

JAPETUS—TITAN

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1908	h m s	°	h m s	″			in.			
Aug. 29	13 11 38	149. 871	13 11 42	49. 43	8, 8	2	26	375, Brt.	Hd.	
30	12 50 6	139. 186	12 50 7	50. 43	8, 8	1	26	375, Brt.	Hd.	
31	13 9 19	117. 598	13 9 27	76. 79	8, 8	2	26	388, Brt.	Hd.	
Sept. 1	13 19 17	104. 462	13 19 17	134. 43	8, 8	1	26	375, Brt.	Hd.	
3	12 24 25	94. 866	12 24 51	314. 13	8, 8	2	26	388, Red.	Hd.	
		Δα		Δδ						
		s		″						
8	12 28 12	+47. 258	-- -- --	+ 44. 81	t15, 5	2	26	388, Red.	Hd.	
12	12 0 38	+35. 680	-- -- --	+117. 09	t15, 5	2	26	388, Red.	Hd.	
22	11 30 4	+39. 630	-- -- --	+126. 72	t14, 5	1	26	388, Red.	Hd.	
		p		s						
		°		″						
29	12 4 32	25. 207	12 4 39	174. 44	8, 8	2	26	388, Brt.	Hd.	
30	11 1 42	352. 411	11 1 49	151. 50	8, 8	2	26	388, Brt.	Hd.	
Oct. 2	10 51 25	310. 938	10 51 26	189. 74	8, 8	4	26	388, Brt.	Hd.	
3	10 58 58	303. 539	10 59 19	195. 58	8, 9	4	26	388, Brt.	Hd.	
4	10 25 6	300. 193	10 25 20	182. 47	8, 9	3	26	388, Brt.	Hd.	
5	10 32 10	299. 594	10 32 22	153. 65	8, 8	1	26	388, Brt.	Hd.	
7	9 41 22	305. 937	9 41 27	86. 89	8, 8	2	26	388, Brt.	Hd.	
		Δα		Δδ						
		s		″						
17	10 22 13	−46. 598	-- -- --	− 20. 62	t18, 6	2	26	388, Red.	Hd.	Thick haze.
26	8 43 46	−24. 037	-- -- --	−119. 79	t18, 6	3	26	388, Red.	Hd.	Unsteady.
1909										
Oct. 25	11 37 31	+37. 533	-- -- --	+138. 26	t15, 5	2	26	388, Brt.	Ep.	
25	12 3 48	+37. 537	-- -- --	+137. 93	t15, 5	2	26	388, Brt.	Hl.	Japetus ft.
30	11 18 27	+29. 061	-- -- --	+201. 75	t15, 5	2	26	388, Brt.	Ep.	
30	11 33 4	+28. 962	-- -- --	+201. 86	t15, 5	2–3	26	388, Brt.	Hl.	
31	11 10 27	+21. 785	-- -- --	+207. 75	t15, 5	3	26	388, Brt.	Ep.	
31	11 24 0	+21. 729	-- -- --	+207. 75	t15, 5	3	26	388, Brt.	Ep.	
31	11 36 5	+21. 573	-- -- --	+207. 97	t15, 5	3	26	388, Brt.	Hl.	Japetus ft. Haze.
		p		s						
		°		″						
Nov. 4	10 19 41	332. 785	10 29 22	189. 96	4, 4	3	26	388, Brt.	Ep.	
4	10 44 16	332. 418	10 37 33	190. 11	4, 4	3	26	388, Brt.	Ep.	
4	11 3 37	332. 114	11 21 17	190. 30	4, 4	2–3	26	388, Brt.	Hl.	
4	11 52 40	331. 463	11 35 56	190. 30	4, 4	2–3	26	388, Brt.	Hl.	
6	8 10 36	307. 997	8 24 49	204. 45	4, 4	3	26	388, Brt.	Hl.	
6	8 48 18	307. 803	8 37 49	204. 43	4, 4	3	26	388, Brt.	Hl.	
		Δα		Δδ						
		s		″						
Dec. 6	9 59 41	−38. 313	-- -- --	−143. 68	t30, 10	3	26	388, Brt.	Hl.	
1910										
Sept. 12	15 23 48	+42. 940	-- -- --	+198. 55	t24, 8	2–3	26	388, Brt.	Hl.	Japetus. v. ft. Clouded. Poor obsn.

SATELLITES OF SATURN

JAPETUS—TITAN—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1910	h m s	°	h m s	"			in.			
Sept. 22	13 58 32	325. 346	13 58 56	165. 26	4, 4	3	26	388, Brt.	Hl.	
22	14 50 51	325. 069	14 54 3	164. 14	4, 4	3	26	388, Brt.	Hl.	
24	11 28 24	330. 861	11 27 58	108. 54	4, 4	3	26	388, Brt.	Hl.	
24	12 15 58	331. 275	12 23 42	107. 37	4, 4	3	26	388, Brt.	Hl.	Clouded.
26	13 9 8	8. 144	13 10 47	83. 19	4, 4	2	26	388, Brt.	Hl.	
27	13 31 34	12. 842	13 31 4	89. 90	4, 4	2–3	26	388, Brt.	Hl.	Clds.
28	11 36 12	1. 793	11 36 35	96. 13	4, 4	3–4	26	388, Brt.	Hl.	
29	13 7 9	334. 650	13 9 47	117. 52	4, 4	2–3	26	388, Brt.	Hl.	Japetus v. ft. Clds. Haze.
		Δα		Δδ						
		s		"						
Oct. 17	13 53 54	−31. 515	-- -- --	−116. 23	t30, 10	2	26	388, Brt.	Hl.	
18	12 0 33	−35. 344	-- -- --	−118. 55	t27, 9	2	26	388, Blk.	Hl.	Moonlight.
20	11 9 57	−42. 068	-- -- --	−144. 61	t30, 10	2	26	388, Brt.	Hl.	
		p		s						
		°		"						
Dec. 9	10 44 15	323. 092	10 58 8	207. 77	2, 2	2–3	26	388, Brt.	Hl.	Japetus too ft. to finish.
13	8 26 11	306. 563	8 27 23	123. 30	4, 4	2–3	26	388, Brt.	Hl.	Haze.
17	8 57 22	317. 919	9 0 20	98. 40	4, 4	2	26	388, Brt.	Hl.	
21	8 51 36	279. 134	8 53 36	414. 62	4, 5	3	26	388, Brt.	Hl.	
1911										
Jan. 4	8 46 28	252. 571	-- -- --	------	2, 0	3	26	388, Brt.	Hl.	Driving clock stopped.
16	8 38 24	176. 274	8 41 9	192. 51	4, 4	2–3	26	388, Brt.	Hl.	
Sept. 13	13 40 1	194. 565	13 52 49	240. 31	4, 4	2–3	26	367, Red.	Hl.	Moonlight.
13	14 13 6	194. 272	14 2 26	240. 42	4, 4	2–3	26	367, Red.	Hl.	
16	14 5 1	148. 807	14 24 0	152. 19	4, 4	4	26	367p, Red.	Hl.	Possibly star instead of Japetus.
16	14 42 25	148. 633	14 33 5	151. 84	4, 4	4	26	367p, Red.	Hl.	
20	15 36 13	190. 451	15 51 46	72. 39	4, 4	3	26	495p, Brt.	Hl.	
20	16 14 50	190. 905	16 0 8	72. 65	4, 4	3	26	495p, Brt.	Hl.	
		Δα		Δδ						
		s		"						
30	15 14 30	+46. 209	-- -- --	+ 17. 85	t30, 10	3	26	367, Red.	Bn.	
Oct. 4	12 32 2	+72. 771	-- -- --	+ 29. 77	t24, 8	3–4	26	367, Red.	Bn.	Possibly star instead of Japetus.
18	14 20 16	+39. 483	-- -- --	+271. 60	t30, 10	2	26	367, Red.	Bn.	Japetus v. ft. Clouded.
		p		s						
		°		"						
23	13 16 53	10. 669	13 15 33	254. 28	4, 4	3	26	367p, Brt.	Bn.	
23	13 46 25	10. 364	13 44 52	253. 13	4, 4	3	26	367p, Brt.	Bn.	
24	15 17 7	352. 273	15 17 37	216. 02	4, 4	3–4	26	367p, Brt.	Bn.	
24	15 44 2	351. 891	15 46 55	215. 20	4, 4	3–4	26	367p, Brt.	Bn.	
25	12 26 25	339. 878	12 26 40	194. 23	4, 4	1–2	26	367p, Brt.	Bn.	

SATELLITES OF SATURN

JAPETUS—TITAN—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1911	h m s	°	h m s	''			in.			
Oct. 25	12 53 41	339. 576	12 52 56	194. 09	4, 4	1–2	26	367p, Brt.	Bn.	
26	11 56 16	331. 029	11 56 29	170. 12	4, 4	2–3	26	367b, Brt.	Bn.	
26	12 25 32	330. 872	12 26 26	169. 48	4, 4	2–3	26	367p, Brt.	Bn.	
29	10 33 56	353. 103	10 34 17	88. 90	4, 4	3–4	26	367p, Brt.	Bn.	
29	11 0 38	353. 576	11 0 33	88. 73	4, 4	3–4	26	367p, Brt.	Bn.	
Nov. 1	9 47 56	11. 824	9 49 29	111. 29	4, 4	2–3	26	367p, Brt.	Bn.	
1	10 9 42	11. 616	10 9 35	111. 42	4, 4	2–3	26	367p, Brt.	Bn.	
2	11 6 39	348. 935	11 6 44	126. 41	4, 4	3	26	367p, Brt.	Bn.	
2	11 30 1	348. 458	11 30 55	126. 82	4, 4	3	26	367p, Brt.	Bn.	
		$\Delta\alpha$		$\Delta\delta$						
		s		''						
11	9 53 22	−47. 739	-- -- --	− 93. 76	t18, 6	2–3	26	367, Brt.	Bn.	Stopped by clds.
19	13 3 56	−27. 807	-- -- --	−118. 09	t30, 10	3–4	26	367, Brt.	Bn.	Haze.
21	9 41 19	−34. 874	-- -- --	−113. 38	t30, 10	2	26	367, Brt.	Bn.	
22	12 0 31	−39. 310	-- -- --	−125. 80	t30, 10	2	26	367, Brt.	Bn.	Japetus ft. at times. Interrupted by haze.
26	11 45 48	−40. 951	-- -- --	−231. 08	t30, 10	2	26	367, Brt.	Bn.	
		p		s						
		°		''						
Dec. 5	11 10 49	128. 493	11 11 56	180. 48	4, 4	2–3	26	367p, Brt.	Bn.	
5	11 35 29	128. 368	11 37 20	179. 96	4, 4	2–3	26	367p, Brt.	Bn.	Bright moonlight.
7	8 1 9	124. 508	8 1 58	119. 82	4, 4	2	26	495p, Brt.	Bn.	
7	8 23 3	124. 565	8 24 3	119. 31	4, 4	2	26	495p, Brt.	Bn.	
8	7 21 12	130. 694	7 21 59	88. 56	4, 4	2	26	495p, Brt.	Bn.	
8	7 40 27	130. 721	7 41 7	88. 42	4, 4	2	26	495p, Brt.	Bn.	
11	8 48 24	143. 745	8 49 14	90. 55	4, 4	2	26	367p, Brt.	Bn.	Stopped by haze.
		$\Delta\alpha$		$\Delta\delta$						
		s		''						
18	8 42 42	+45. 530	-- -- --	+6. 61	t30, 10	2–3	26	367, Brt.	Bn.	Japetus ft.
		p		s						
1912		°		''						
Jan. 10	9 14 30	11. 883	9 18 6	250. 63	4, 4	3–4	26	367p, Brt.	Bn.	
10	9 43 47	11. 494	9 43 14	249. 93	4, 4	3–4	26	367p, Brt.	Bn.	
1913										
Oct. 13	12 42 29	11. 422	12 39 53	162. 57	4, 4	3–4	26	388, Brt.	Hl.	
13	13 29 54	11. 271	13 31 39	161. 17	4, 4	3–4	26	388, Brt.	Hl.	Japetus ft.
16	14 12 36	38. 979	14 14 6	108. 43	4, 4	3	26	388, Brt.	Hl.	Clds.
16	14 56 25	39. 491	14 58 28	109. 08	4, 4	3	26	388, Brt.	Hl.	
22	12 9 36	355. 300	12 7 33	175. 87	4, 4	2–3	26	367b, Brt.	Hl.	
22	13 0 28	354. 046	12 59 35	176. 63	4, 4	2–3	26	367b, Brt.	Hl.	

SATELLITES OF SATURN

JAPETUS—TITAN—Continued

Date	W. M. T.	Δα	W. M. T.	Δδ	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1913	h m s	s	h m s	″			in.			
Oct. 26	13 44 33	−33. 328	-- -- --	+110. 28	t29, 10	2	26	388, Brt.	Hl.	
28	13 49 26	−43. 625	-- -- --	+ 14. 47	t30, 10	3	26	388, Brt.	Hl.	Japetus ft. at times.
29	15 9 31	−45. 533	-- -- --	− 38. 80	t30, 10	3	26	388, Brt.	Hl.	
31	15 14 44	−42. 218	-- -- --	−118. 09	t30, 10	3	26	388, Brt.	Hl.	
Nov. 1	13 11 0	−38. 576	-- -- --	−137. 79	t30, 10	2	26	367b, Brt.	Hl.	
2	15 11 49	−33. 651	-- -- --	−145. 14	t30, 10	1–2	26	367b, Brt.	Hl.	
5	14 46 58	−26. 000	-- -- --	− 98. 42	t30, 10	2	26	388, Brt.	Hl.	
		p		*s*						
		°		″						
20	12 17 40	192. 437	12 16 54	224. 85	4, 4	2–3	26	388, Brt.	Hl.	Clock ran badly.
20	12 59 32	192. 005	13 0 50	223. 05	4, 4	2–3	26	388, Brt.	Hl.	
21	12 49 55	174. 591	12 50 45	177. 55	4, 4	2	26	388, Brt.	Hl.	Fog. Moonlight.
21	13 56 37	173. 902	13 54 45	175. 76	4, 4	2	26	388, Brt.	Hl.	
22	11 35 45	160. 996	11 36 54	145. 63	4, 4	2	26	367b, Brt.	Hl.	
22	12 12 58	160. 674	12 15 27	144. 60	4, 4	2	26	367b, Brt.	Hl.	
24	11 44 6	156. 684	11 43 55	84. 14	4, 4	3	26	388, Brt.	Hl.	Windy.
24	12 9 48	157. 102	12 11 32	83. 74	4, 4	3	26	388, Brt.	Hl.	
		Δα		Δδ						
		s		″						
Dec. 5	11 40 2	+40. 782	-- -- --	− 71. 23	t30, 10	2–3	26	367b, Brt.	Hl.	Japetus v. ft.
8	12 54 32	+50. 489	-- -- --	+ 86. 01	t30, 10	3–4	26	367b, Brt.	Hl.	Japetus ft.
11	9 33 45	+41. 340	-- -- --	+174. 47	t30, 10	2–3	26	367b, Red.	Hl.	Moonlight.
13	13 6 28	+31. 988	-- -- --	+169. 58	t30, 10	2–3	26	388, Brt.	Hl.	Japetus v. ft. at last. Moonlight.
18	12 14 35	+36. 162	-- -- --	+ 86. 93	t30, 10	2–3	26	388, Brt.	Hl.	Japetus ft.
19	12 14 28	+41. 106	-- -- --	+ 94. 31	t30, 10	2	26	367b, Brt.	Hl.	
		p		*s*						
		°		″						
29	10 2 9	26. 873	10 2 0	301. 09	4, 4	2	26	367b, Brt.	Hl.	
30	7 48 20	13. 605	7 48 40	243. 33	4, 4	2	26	367b, Red.	Hl.	
30	8 24 23	13. 141	8 25 47	241. 64	4, 4	2	26	367b, Red.	Hl.	Haze. Fog.
1914										
Jan. 5	13 15 55	32. 991	13 18 45	98. 26	4, 4	3	26	367b, Brt.	Hl.	
5	13 51 20	33. 194	13 53 10	98. 90	4, 4	3	26	367b, Brt.	Hl.	
7	8 22 46	31. 287	8 22 18	132. 12	4, 4	2–3	26	367b, Brt.	Hl.	
7	8 52 27	31. 057	8 53 26	132. 33	4, 4	2–3	26	367b, Brt.	Hl.	Japetus ft. at last. Moonlight. Haze.
		Δα		Δδ						
		s		″						
15	8 9 27	−44. 146	-- -- --	+ 29. 43	t30, 10	3	26	388, Brt.	Hl.	Clds.
28	7 22 35	−37. 455	-- -- --	− 86. 42	t30, 10	2–3	26	388, Brt.	Hl.	
Feb. 2	10 35 47	−39. 917	10 55 51	−245. 87	t15, 6	---	26	388, Brt.	Hl.	Stopped by haze.
3	8 40 24	−34. 619	-- -- --	−269. 02	t30, 10	2–3	26	388, Brt.	Hl.	Japetus ft. at times. Clds.

SATELLITES OF SATURN

JAPETUS—TITAN—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1914	h m s	°	h m s	″			in.			
Feb. 7	8 59 36	191. 371	8 59 40	238. 28	4, 4	3	26	367b, Brt.	Hl.	
7	9 45 51	190. 821	9 46 6	236. 68	4, 4	3	26	367b, Brt.	Hl.	
9	9 54 7	151. 134	9 54 38	174. 12	4, 4	3	26	367b, Brt.	Hl.	
9	10 30 50	150. 704	10 30 19	173. 58	4, 4	3	26	367b, Brt.	Hl.	
12	9 1 49	129. 492	9 3 57	96. 92	4, 4	3	26	388, Brt.	Hl.	
12	9 34 1	129. 567	9 34 52	96. 64	4, 4	3	26	388, Brt.	Hl.	
17	7 34 11	160. 311	7 35 18	105. 90	4, 4	3	26	388, Red.	Hl.	
17	8 21 36	159. 742	8 24 17	106. 62	4, 4	3	26	388, Red.	Hl.	
Mar. 4	9 54 24	68. 376	9 56 28	389. 41	4, 4	3	26	388, Red.	Hl.	
7	8 0 0	77. 198	8 3 1	411. 11	4, 4	3	26	388, Red.	Hl.	
7	8 54 32	77. 247	8 54 24	412. 32	4, 4	3	26	388. Red.	Hl.	Moonlight.
1915										
Oct. 25	15 2 35	264. 875	15 3 0	337. 17	4, 4	3–4	26	388, Brt.	Hl.	
27	16 3 44	270. 388	16 19 8	409. 18	4, 2	3–4	26	388, Brt.	Hl.	
30	15 47 3	267. 867	15 48 51	610. 52	4, 4	3	26	388, Brt.	Hl.	
		Δα		Δδ						
		s		″						
Nov. 5	13 59 5	−37. 554	-- -- --	−198. 85	t49, 10	2–3	26	367b, Brt.	Hl.	
		p		s						
		°		″						
5	15 11 1	249. 003	15 8 5	555. 74	4, 4	3	26	388, Brt.	Hl.	
9	13 15 50	223. 297	13 15 27	188. 25	4, 4	3–4	26	388, Brt.	Hl.	
10	14 8 3	215. 372	14 10 20	125. 40	4, 4	2–3	26	388, Brt.	Hl.	Fogged eyepiece frequently.
17	12 38 4	242. 428	12 38 5	164. 97	4, 4	3	26	388, Brt.	Hl.	
22	12 29 25	119. 228	12 32 1	285. 02	4, 4	2	26	388, Red.	Hl.	Moonlight. Haze.
24	12 19 10	99. 811	12 28 21	485. 48	4, 6	2	26	388, Red.	Hl.	Clock running fast.
30	11 59 13	78. 553	11 56 26	541. 94	4, 4	3–4	26	388, Red.	Hl.	
Dec. 2	13 50 10	78. 060	13 54 43	435. 80	4, 4	3	26	388, Red.	Hl.	
9	11 13 19	86. 991	11 14 40	681. 96	4, 4	3	26	388, Red.	Hl.	
10	13 25 48	84. 466	13 28 54	748. 01	4, 4	3	26	388, Brt.	Hl.	
1916										
Jan. 3	13 57 25	279. 580	13 58 37	507. 13	4, 5	3–4	26	388, Brt.	Hl.	
7	12 37 38	262. 249	12 42 6	620. 63	4, 6	3–4	26	388, Brt.	Hl.	
13	10 7 48	263. 249	10 7 0	378. 25	4, 5	3–4	26	388, Brt.	Hl.	
18	8 56 57	265. 843	-- -- --	------	2, 0	3–4	26	388, Brt.	Hl.	Clouded.
20	10 23 0	260. 372	10 26 2	729. 10	4, 6	3	26	388, Brt.	Hl.	
26	9 6 10	227. 814	9 8 6	320. 63	4, 4	2	26	388, Red.	Hl.	Haze. Clds.
31	8 50 34	168. 869	9 0 18	52. 29	2, 2	---	26		Hl.	
Mar. 9	8 29 30	16. 665	8 30 38	122. 67	4, 4	2	26	388, Brt.	Hl.	
10	10 34 36	12. 400	10 35 24	84. 66	4, 4	3	26	388, Red.	Hl.	Windy.
16	10 48 51	44. 898	10 45 54	151. 50	4, 4	3	26	388, Brt.	Hl.	
17	8 47 12	26. 827	8 45 39	144. 30	4, 4	2–3	26	388, Brt.	Hl.	
23	10 7 20	276. 757	10 6 39	512. 83	4, 4	3	26	388, Brt.	Hl.	
25	9 29 58	267. 538	-- -- --	------	2, 0	3	26	388, Red.	Hl.	Too unsteady to finish.
Apr. 10	8 47 56	255. 295	8 49 19	620. 71	4, 7	2–3	26	388, Brt.	Hl.	

SATELLITES OF URANUS

TITANIA—URANUS

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1908	h m s	°	h m s	"			in.			
June 4	14 9 22	205. 05	14 13 24	31. 03	9, 8	3	26	375	Hl.	Clouded over.
7	14 55 32	337. 49	15 17 55	32. 13	5, 7	3–4	26	375	Hl.	Too poor to finish.
8	13 30 42	9. 94	13 30 38	33. 50	9, 8	2–4	26	---	Hl.	
22	12 14 0	221. 90	12 34 21	31. 66	4, 4	2–3	26	---	Hl.	Clouded over.
26	12 21 2	31. 55	12 23 44	32. 18	9, 8	2–3	26	---	Hl.	
July 1	12 6 47	239. 22	-- -- --	-----	4, 0	---	26	---	Hl.	Too much haze to finish.
5	11 56 47	42. 81	12 1 17	31. 20	9, 8	---	26	---	Hl.	Clds. passing over.
8	11 36 56	173. 26	11 41 5	31. 16	8, 8	---	26	---	Hl.	
10	11 44 15	249. 54	11 48 19	29. 38	8, 8	2	26	---	Hl.	Ft. Moonlight.
15	11 14 9	98. 03	11 15 38	37. 90	8, 8	4	26	---	Hl.	Ft. A star has probably been measured for Titania.
28	10 8 31	274. 58	10 11 0	28. 96	8, 8	3–4	26	---	Hl.	Clds.
Aug. 1	9 50 38	75. 89	10 28 9	27. 40	4, 5	5	26	---	Hl.	Sat. went out. Could not finish.
1909										
Apr. 23	15 29 13	239. 75	15 49 15	27. 09	4, 4	3	26	388	Hl.	V. ft. Twilight. Too faint to finish.
May 17	15 11 46	162. 24	15 16 33	29. 71	7, 8	2–3	26	388	Hl.	V. ft. Went out.
23	14 35 50	37. 85	15 10 50	30. 60	4, 4	2	26	388	Hl.	Clouded over.
June 18	13 37 30	33. 14	13 44 10	31. 84	8, 9	3–4	26	388	Hl.	Faint star near.
19	13 1 19	75. 39	13 7 6	27. 02	8, 8	2	26	388	Hl.	V. ft. Haze.
21	12 53 16	167. 82	12 53 12	31. 17	8, 8	2–3	26	388	Hl.	
22	13 41 0	202. 71	13 41 7	31. 42	8, 8	2	26	388	Hl.	
July 6	11 42 4	54. 80	12 8 4	30. 02	4, 4	3–4	26	388	Hl.	V. ft. Moonlight. Haze. Too poor to finish.
7	12 34 16	103. 98	12 32 46	26. 90	8, 8	3	26	388	Hl.	Ft.
8	11 39 33	148. 31	11 37 42	29. 50	8, 8	3–4	26	388	Hl.	
10	13 7 48	223. 27	13 11 27	30. 65	8, 8	2	26	388	Hl.	
11	11 32 20	265. 03	11 41 25	27. 68	8, 8	2	26	388	Hl.	Clouded over frequently.
16	11 25 52	116. 06	11 27 25	27. 23	8, 8	3–4	26	388	Hl.	
17	12 31 14	162. 53	12 34 2	30. 25	8, 8	3–4	26	388	Hl.	V. difficult.
19	11 5 19	232. 08	11 9 7	29. 91	7, 12	3–4	26	388	Hl.	Could not finish.
1910										
July 5	12 11 18	353. 45	12 12 48	32. 13	4, 4	3	26	388	Hl.	
9	11 54 11	161. 38	11 55 37	30. 67	4, 4	2	26	388	Hl.	V. ft. Haze.
10	11 59 25	194. 87	12 0 24	31. 90	4, 4	3	26	388	Hl.	
14	12 16 58	2. 12	12 18 39	32. 83	4, 4	2	26	388	Hl.	
31	10 29 17	345. 65	10 33 49	31. 74	4, 4	2	26	388	Hl.	Ft.
Aug. 5	9 59 7	189. 48	9 59 59	32. 83	4, 4	2–3	26	388	Hl.	
9	9 45 26	356. 93	9 49 19	32. 13	4, 4	3–4	26	388	Hl.	V. ft. Haze.
1911										
June 1	15 11 51	1. 24	15 11 23	31. 82	8, 8	4	26	---	Ep.	
9	15 11 45	339. 08	15 18 7	30. 87	4, 3	2	26	367	Ep.	Stopped by clds.
18	13 55 13	347. 29	13 57 16	31. 91	9, 10	4	26	367	Ep.	
27	13 21 57	355. 84	13 22 24	32. 70	8, 8	3	26	367	Ep.	
28	12 47 37	27. 42	12 48 30	30. 09	10, 12	4	26	367	Ep.	
29	13 59 15	73. 00	13 59 1	23. 97	8, 9	2	26	495p	Ep.	
30	14 10 4	127. 73	14 10 19	25. 98	8, 11	4	26	367	Ep.	
July 5	12 24 6	330. 99	12 23 51	29. 71	10, 9	2	26	367	Ep.	Ft.
18	12 54 29	149. 20	12 56 29	28. 78	9, 8	---	26	367	Ep.	
24	12 29 35	23. 75	12 32 13	30. 65	10, 10	5	26	495	Ep.	V. windy.
30	11 46 48	277. 19	11 47 29	23. 89	8, 8	3	26	495	Ep.	
Aug. 18	9 34 42	344. 21	9 34 39	31. 55	9, 9	3	26	495	Ep.	
21	10 30 21	107. 06	10 30 5	24. 98	8, 8	2	26	495	Ep.	
22	9 54 58	152. 01	9 54 14	29. 34	8, 9	2	26	495	Ep.	Ft. Perhaps haze.
Sept. 11	9 36 47	245. 79	9 37 59	25. 64	8, 8	3	26	367	Ep.	Ft. Moonlight.
13	9 46 4	339. 79	9 45 36	30. 37	8, 8	3	26	495	Ep.	

1757—29——9

SATELLITES OF URANUS

TITANIA—URANUS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1912	h m s	°	h m s	"			in.			
July 5	12 19 16	341. 92	12 27 44	30. 90	4, 4	2	26	388	Hl.	Ft.
6	12 8 23	11. 08	12 10 42	30. 93	4, 4	2	26	388	Hl.	
8	12 48 22	106. 96	12 50 27	22. 73	4, 4	2–3	26	388	Hl.	
9	13 57 44	154. 10	13 57 58	29. 28	4, 4	2	26	388	Hl.	Ft.
15	14 14 37	23. 72	14 17 5	29. 44	4, 4	3	26	388	Hl.	V. ft. Haze.
22	13 14 51	329. 64	13 15 48	28. 51	4, 4	3	26	388	Hl.	V. ft. Haze.
Aug. 7	11 43 0	256. 03	11 42 37	23. 16	4, 4	2–3	26	388	Hl.	V. ft. Haze.
10	10 57 14	16. 68	11 1 51	30. 73	4, 4	2–3	26	388	Hl.	Haze.
12	10 53 21	112. 84	10 56 14	23. 12	4, 4	2	26	388	Hl.	Haze.
1913										
July 10	12 26 43	162. 73	12 32 37	30. 86	4, 4	2–3	26	388	Hl.	V. ft. and difficult at times.
10	13 33 23	163. 51	13 44 54	30. 49	4, 4	2–3	26	388	Hl.	Delayed by haze and cld.
25	12 1 11	43. 97	12 4 32	24. 64	4, 4	2–3	26	388	Hl.	
25	12 52 52	44. 57	12 53 26	24. 22	4, 4	2–3	26	388	Hl.	
Aug. 2	11 9 9	15. 68	11 15 2	29. 89	4, 4	2–3	26	388	Hl.	
2	12 14 33	17. 30	12 18 27	29. 66	4, 4	2–3	26	388	Hl.	
25	9 40 10	245. 83	9 41 54	22. 09	4, 4	2–3	26	388	Hl.	V. ft.
25	10 48 27	249. 31	10 47 12	21. 97	4, 4	2–3	26	388	Hl.	
30	8 53 11	103. 66	8 55 0	21. 35	4, 4	2	26	388	Hl.	Ft. Interrupted by haze and clds.
30	9 20 35	105. 34	-- -- --	-----	2, 0	2	26	388	Hl.	Stopped by clds.
Sept. 1	9 26 14	180. 95	9 34 58	31. 55	4, 4	2–3	26	388	Hl.	Ft. Haze.
1	10 56 5	183. 07	10 51 16	31. 79	4, 4	2–3	26	388	Hl.	
5	8 25 12	349. 59	8 25 20	31. 67	4, 4	2	26	388	Hl.	
5	9 20 22	351. 02	9 21 19	31. 82	4, 4	2	26	388	Hl.	
22	9 21 57	340. 02	9 21 58	28. 98	4, 5	3–4	26	388	Bn.	Too poor to continue.
23	8 24 32	6. 52	8 24 46	30. 54	4, 5	2	26	388	Bn.	
23	8 44 46	6. 77	8 45 14	30. 81	4, 4	2	26	388	Bn.	
24	8 28 17	40. 72	8 29 4	25. 19	4, 4	2–3	26	388	Bn.	
24	8 47 42	41. 25	8 48 26	24. 89	4, 4	2–3	26	388	Bn.	
1914										
July 15	13 49 19	343. 20	13 48 53	31. 25	4, 4	3	26	388	Hl.	
19	11 51 48	152. 09	11 52 16	27. 90	4, 4	3	26	388	Hl.	
28	12 22 48	162. 48	12 21 44	30. 09	4, 4	3	26	388	Hl.	
29	11 35 37	185. 24	11 37 21	31. 09	4, 4	3–4	26	388	Hl.	
31	12 2 30	280. 35	11 56 47	20. 53	4, 4	3	26	388	Hl.	V. ft.
Aug. 13	10 49 14	97. 58	10 54 24	19. 17	4, 4	3	26	388	Hl.	V. ft. Fog.
15	10 57 47	175. 25	11 2 32	31. 62	4, 4	3	26	388	Hl.	
16	10 41 42	201. 99	10 47 12	27. 50	4, 4	2–3	26	388	Hl.	Ft. Haze.
17	10 57 2	250. 84	10 57 56	19. 70	4, 4	3	26	388	Hl.	V. ft. Haze.
18	10 19 26	311. 54	10 19 24	25. 21	4, 4	3	26	388	Hl.	Ft.
19	10 25 2	344. 65	10 24 46	32. 16	4, 4	2–3	26	388	Hl.	
23	10 43 47	156. 32	10 46 28	28. 61	4, 4	3	26	388	Hl.	Ft. Haze.
Sept. 5	9 37 32	331. 38	9 36 55	28. 66	4, 4	2	26	388	Hl.	V. ft. Moonlight. Thin clds.
13	9 2 54	300. 98	9 5 26	22. 89	4, 4	3	26	388	Hl.	
15	9 3 15	5. 89	9 7 32	30. 41	4, 4	3	26	388	Hl.	
21	8 31 31	256. 23	8 36 11	19. 64	4, 4	2–3	26	388	Hl.	V. ft. Haze.
1915										
July 6	14 35 35	316. 60	14 44 27	22. 97	2, 4	3	26	388	Bn.	Clouded.
8	14 48 7	8. 21	14 47 41	28. 91	4, 4	3–4	26	388	Bn.	
17	14 14 12	16. 65	14 10 11	26. 44	4, 5	3	26	388	Bn.	
Aug. 10	12 38 39	319. 52	12 46 3	24. 05	4, 4	2	26	388	Bn.	Haze.
12	13 17 51	12. 37	13 20 14	28. 30	4, 4	3	26	388	Bn.	
Oct. 11	8 40 46	345. 81	8 39 54	30. 01	4, 4	2	26	388	Bn.	
12	7 38 24	8. 18	7 37 53	28. 64	4, 4	2–3	26	388	Bn.	
25	8 5 12	187. 69	8 5 48	28. 74	4, 4	3–4	26	388	Bn.	

SATELLITES OF URANUS

TITANIA—URANUS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
	h m s	°	h m s	″			in.			
1919										
Aug. 9	12 2 19	174. 97	12 1 17	29. 36	4, 4	3	26	367	Bn.	Moonlight.
Sept. 29	9 21 2	157. 48	9 24 7	27. 23	4, 4	2	26	495	Hl.	V. ft.
1920										
Aug. 8	11 50 45	166. 76	11 54 45	31. 44	4, 4	3	26	367	Hl.	
21	11 6 7	344. 61	11 7 28	31. 77	4, 4	2	26	495	Hl.	Ft. Haze. Fog.
Sept. 3	11 53 31	165. 48	11 53 17	31. 06	4, 6	2–3	26	495	Hl.	Ft. Haze.
4	11 31 9	176. 28	11 35 26	26. 56	4, 4	2	26	495	Hl.	Ft.
15	10 1 18	329. 63	10 4 41	19. 78	4, 4	3	26	495	Hl.	V. ft.
16	10 53 30	343. 91	10 52 10	31. 47	4, 4	4	26	495	Hl.	
17	9 33 27	354. 22	9 34 14	28. 75	4, 4	3	26	495	Hl.	
21	10 21 3	171. 13	10 23 33	30. 31	4, 4	3	26	495	Hl.	Ft. Haze. Moonlight.
Oct. 5	9 59 43	3. 88	10 6 30	20. 55	4, 4	4	26	495	Hl.	
14	9 2 21	16. 06	9 26 8	15. 66	3, 4	3	26	495	Hl.	V. ft. Haze. Too poor to finish.
17	9 21 18	170. 24	9 20 29	31. 30	4, 5	3	26	495	Hl.	Seeing 4 for last two angles.
Nov. 4	8 20 55	177. 14	7 58 40	27. 06	4, 4	4	26	495	Hl.	
13	8 34 20	179. 89	8 35 43	22. 96	4, 4	3	26	495	Hl.	Eyepiece fogged.
1921										
Aug. 25	11 33 16	157. 66	11 32 28	22. 38	4, 4	3	26	495	Hl.	
26	12 48 52	165. 45	12 47 34	31. 68	4, 4	2	26	495	Hl.	
27	11 3 49	172. 76	11 3 40	25. 79	4, 4	3–2	26	495	Hl.	Haze.
30	11 0 12	341. 81	10 54 2	29. 83	4, 4	3–4	26	495	Hl.	Haze.
Sept. 7	11 9 1	335. 90	11 6 32	20. 99	4, 4	2	26	495	Hl.	Haze. Finally clouded. Sat. ft. at times.
Oct. 14	9 16 50	353. 51	9 17 21	25. 03	5, 5	2	26	495	Hl.	Moonlight. Haze. Titania very ft.
17	8 27 24	162. 90	8 23 34	29. 68	5, 5	2	26	495	Hl.	Moonlight. Haze. Titania very ft.
18	8 31 54	171. 49	8 30 44	29. 00	4, 4	3	26	495	Hl.	Moonlight and haze. Titania very ft.
21	8 17 22	338. 40	8 18 19	25. 65	4, 4	3	26	495	Hl.	
26	7 42 16	165. 07	7 43 50	30. 66	4, 4	2	26	495	Hl.	Haze. Titania ft.
Nov. 25	7 53 17	340. 46	7 52 44	27. 01	4, 4	3–2	26	495	Hl.	Haze.
1922										
Aug. 21	11 15 6	337. 77	11 11 33	16. 45	4, 4	2	26	495	Hl.	Haze. Titania ft.
22	12 31 19	343. 77	12 34 51	30. 20	4, 4	3	26	495	Hl.	Haze.
Sept. 14	11 13 10	169. 44	11 10 4	26. 56	4, 4	4	26	495	B.	Titania ft.
22	10 33 2	165. 61	10 25 56	31. 53	4, 4	4	26	495	B.	Titania ft.
26	9 15 44	343. 92	9 17 15	30. 43	4, 5	3	26	495	B.	
1925										
Sept. 26	11 32 1	351. 19	11 33 57	21. 93	4, 4	3–4	26	495	Hl.	
Nov. 6	8 2 45	162. 31	8 2 12	29. 20	4, 4	3	26	495	Hl.	Haze. Titania ft.
9	8 0 57	347. 24	8 2 17	26. 09	4, 4	3	26	495	Hl.	
10	9 2 2	343. 85	9 3 33	30. 33	4, 4	2–3	26	495	Hl.	Ft. star near.
11	7 27 52	338. 13	7 27 28	20. 56	4, 4	2–3	26	495	Hl.	

OBERON—URANUS

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1909										
Apr. 26	15 32 48	203. 58	16 2 48	42. 23	4, 4	3	26	388	Hl.	V. ft. Measures very uncertain.
May 12	15 4 35	272. 87	15 8 7	35. 11	8, 8	2–3	26	388	Hl.	V. ft.
16	15 4 24	16. 32	-- -- --	-----	4, 0	3–4	26	388	Hl.	V. ft. Went out.
24	13 38 22	229. 21	-- -- --	-----	4, 0	3–4	26	388	Hl.	Too poor to finish.
29	14 40 38	6. 23	14 42 25	43. 88	8, 8	2–3	26	388	Hl.	Ft.
June 20	13 57 22	231. 14	13 58 59	38. 46	8, 10	2–3	26	388	Hl.	V. ft.
21	13 57 57	259. 84	14 2 41	36. 55	8, 8	3	26	388	Hl.	
22	14 38 36	292. 00	14 38 34	36. 70	8, 10	2–3	26	388	Hl.	Sat. became v. ft.
25	12 2 50	5. 79	-- -- --	-----	4, 0	2–3	26	388	Hl.	V. ft. Stopped by haze and clouds.
July 6	12 53 11	304. 45	13 16 15	38. 70	4, 4	3–4	26	388	Hl.	

SATELLITES OF URANUS

OBERON—URANUS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1909	h m s	°	h m s	″			in.			
July 7	11 23 34	332. 21	11 21 46	42. 07	8, 8	3	26	388	Hl.	Ft.
8	12 55 17	357. 79	12 52 39	44. 16	8, 8	3	26	388	Hl.	
9	11 23 40	17. 93	-- -- --	-----	4, 0	3	26	388	Hl.	Clouded.
10	11 46 27	41. 70	11 48 4	40. 96	8, 8	2	26	388	Hl.	Ft. Clouded over frequently.
11	12 45 27	71. 02	12 49 12	37. 35	8, 8	2	26	388	Hl.	
15	11 9 47	182. 82	11 36 49	41. 63	4, 6	3–4	26	388	Hl.	Haze.
16	12 53 25	207. 73	12 54 59	42. 27	8, 8	3–4	26	388	Hl.	
17	11 6 0	230. 75	11 4 0	39. 60	8, 8	3–4	26	388	Hl.	V. difficult.
20	10 13 51	319. 16	10 54 35	40. 23	4, 8	3–4	26	388	Hl.	V. ft. Stopped by haze and clouds.
1910										
July 9	13 10 59	55. 00	13 11 49	36. 67	4, 4	2	26	388	Hl.	V. ft. Haze.
10	12 28 51	86. 28	12 29 43	34. 23	4, 4	3	26	388	Hl.	
10	13 56 38	87. 04	13 59 41	33. 77	4, 4	3	26	388	Bn.	Oberon fainter than Titania.
14	13 13 3	192. 94	13 11 38	43. 28	4, 4	2–3	26	388	Hl.	
31	11 28 34	290. 05	11 29 59	35. 71	4, 4	3	26	388	Hl.	Ft.
Aug. 9	10 38 22	171. 78	10 42 41	42. 14	4, 4	3–4	26	388	Hl.	V. ft. Haze.
1911										
June 9	14 34 4	14. 02	14 35 56	41. 04	8, 8	3	26	367	Bn.	
18	14 39 31	255. 52	15 10 6	31. 61	4, 8	3–4	26	367	Bn.	V. ft. Stopped by dawn.
21	14 7 2	345. 66	14 11 36	41. 12	8, 8	3	26	367	Bn.	
27	14 7 42	148. 86	14 9 40	39. 03	8, 9	3	26	367	Bn.	
29	13 16 22	189. 20	13 16 12	43. 24	8, 8	2	26	367	Bn.	
30	12 59 12	210. 71	12 56 39	39. 53	8, 9	3	26	367	Bn.	
July 5	13 42 17	355. 37	13 41 2	42. 72	8, 10	2	26	388	Bn.	
24	11 34 14	147. 76	11 36 5	39. 22	8, 8	3	26	495	Bn.	Windy.
27	12 48 2	214. 03	13 3 22	38. 77	4, 8	4	26	495	Ep.	Stopped by clds.
30	11 5 8	306. 78	11 9 21	34. 88	8, 8	3	26	495	Ep.	Haze.
31	12 1 58	334. 40	12 0 2	39. 84	8, 8	2	26	495p	Ep.	Ft.
Aug. 16	9 37 53	26. 17	9 38 59	40. 70	8, 8	3	26	495	Ep.	
18	10 10 51	84. 30	10 21 20	33. 50	5, 4	4	26	495	Ep.	
21	10 2 21	170. 32	10 2 38	41. 85	8, 8	2	26	495p	Ep.	
22	9 24 4	190. 45	9 24 6	42. 71	8, 9	2	26	495	Ep.	Ft.. Perhaps haze.
Sept. 11	8 27 49	6. 23	8 29 4	43. 12	8, 8	3	26	367	Ep.	
12	8 16 47	27. 28	8 20 19	40. 30	8, 8	4	26	367	Ep.	
1912										
July 5	14 6 41	48. 37	14 22 6	33. 36	4, 8	2–3	26	388	Hl.	V. ft.
6	12 48 43	82. 82	12 52 43	29. 59	4, 4	2	26	388	Hl.	
8	12 9 47	148. 10	12 10 45	38. 42	4, 4	2–3	26	388	Hl.	V. ft.
9	12 57 16	170. 42	13 1 28	42. 46	4, 4	2	26	388	Hl.	Ft. Haze.
Aug. 7	12 39 38	210. 06	12 41 56	39. 38	4, 4	3	26	388	Hl.	V. ft. Haze.
12	9 53 58	353. 39	9 55 0	42. 46	4, 4	2–3	26	388	Hl.	V. ft. Haze.
1913										
Sept. 22	8 28 53	33. 36	8 30 51	35. 12	4, 5	3–4	26	388	Bn.	
22	8 54 55	33. 45	8 55 33	35. 29	4, 4	3–4	26	388	Bn.	
23	9 18 21	65. 25	9 20 6	29. 44	4, 4	2	26	388	Bn.	
23	9 36 19	65. 57	9 38 11	29. 11	4, 4	2	26	388	Bn.	
1920										
Aug. 26	10 52 53	352. 59	10 42 18	38. 68	4, 4	3	26	495	Hl.	Ft. Haze. Moonlight.
Sept. 2	10 29 27	174. 84	10 36 50	35. 68	4, 4	3	26	495	Hl.	Ft.
3	10 45 23	188. 37	10 56 39	22. 54	4, 4	2	26	495	Hl.	Ft. Haze.
14	9 52 48	165. 32	9 59 14	41. 39	4, 4	4	26	495	Hl.	
15	11 26 46	172. 58	12 2 42	39. 58	2, 4	3	26	495	Hl.	Stopped by clds.

SATELLITES OF URANUS

OBERON—URANUS—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1920	h m s	°	h m s	″			in.			
Sept. 21	11 5 18	347. 03	11 5 44	42. 67	4, 4	2	26	495	Hl.	Moonlight.
22	9 59 59	353. 92	10 2 32	38. 32	4, 4	3	26	495	Hl.	V. ft. Haze. Moonlight.
Oct. 5	10 48 49	350. 47	10 51 13	40. 76	4, 4	4	26	495	Hl.	
11	10 0 56	166. 77	10 2 11	41. 53	4, 4	3	26	495	Hl.	Ft. Haze.
15	9 10 5	291. 07	9 14 25	12. 72	4, 4	2	26	495	Hl.	V. ft. A little fog. Probably poor obsn.
17	10 43 59	340. 09	10 46 38	39. 18	4, 4	3	26	495	Hl.	Apparently a little fog.
Nov. 13	9 31 12	340. 51	9 31 10	38. 84	4, 4	3	26	388	Hl.	Eyepiece fogged.
1921										
Aug. 24	11 7 36	347. 95	11 6 52	41. 17	4, 4	2	26	495	Hl.	Haze. Ariel visible for short time.
25	12 30 3	353. 43	12 30 26	31. 75	4, 4	3–4	26	495	Hl.	Umbriel visible for short time.
26	11 26 33	5. 12	11 18 46	17. 02	5, 4	3–2	26	495	Hl.	Oberon very ft.
Sept. 8	10 47 19	358. 20	10 49 24	25. 51	4, 4	2	26	495	Hl.	Titania near. Clouded.
19	11 41 43	344. 31	11 31 44	41. 29	4, 4	2	26	495	Hl.	Clds. and haze. Oberon ft.
Oct. 1	8 39 26	333. 21	8 37 17	25. 94	4, 4	3–2	26	495	Hl.	Oberon ft.
2	8 59 32	340. 97	8 50 59	37. 60	4, 4	2	26	495	Hl.	Clds. and haze. Oberon ft.
24	7 36 51	170. 48	7 39 2	39. 33	4, 4	2	26	495	Hl.	Haze. Oberon ft.
28	8 30 0	333. 18	8 29 19	26. 07	4, 4	2	26	495	Hl.	Haze. Oberon ft.
Nov. 25	9 5 26	340. 89	8 56 31	37. 71	4, 4	3	26	495	Hl.	Clds. Fog.
1922										
Aug. 15	11 28 50	164. 65	11 26 53	41. 81	4, 4	3–2	26	495	Hl.	Haze and fog. Oberon ft.
21	12 13 3	342. 99	12 13 7	38. 47	4, 4	2	26	495	Hl.	Haze. Star near.
22	13 55 50	345. 05	13 58 22	41. 86	4, 4	3	26	495	Hl.	Haze.
28	11 15 40	163. 71	11 22 9	39. 86	4, 4	3	26	495	B.	
Sept. 25	9 25 55	165. 84	9 30 44	42. 00	4, 4	3	26	495	B.	Oberon ft.
26	10 24 1	169. 34	10 25 45	34. 61	4, 4	3	26	495	B.	Oberon ft.
1925										
Oct. 10	10 22 12	342. 05	10 25 47	39. 69	4, 4	3–4	26	495	Hl.	Ft. Star near.
Nov. 6	8 48 19	342. 84	8 48 29	39. 50	4, 4	2	26	495	Hl.	Haze. Oberon ft.
10	8 25 10	172. 39	8 25 27	22. 77	4, 4	2	26	495	Hl.	Fog. Oberon ft.
17	7 43 38	350. 07	7 39 29	27. 56	4, 4	3	26	495	Hl.	

OBERON—TITANIA

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1908										
June 7	14 13 17	186. 66	14 13 7	67. 32	8, 8	2	26	375	Hl.	
8	14 31 39	215. 46	14 32 56	69. 16	8, 8	2–3	26	---	Hl.	
26	13 14 32	312. 41	13 20 4	25. 36	8, 8	2–3	26	---	Hl.	Ft. Many stars near.
28	12 42 44	5. 81	12 45 23	44. 47	9, 8	---	26	---	Hl.	V. ft. Sats. went out occasionally.
July 5	12 48 5	229. 44	12 48 33	71. 92	8, 8	---	26	---	Hl.	
8	12 40 33	335. 48	12 42 4	68. 03	8, 9	---	26	---	Hl.	V. ft. Moonlight. Haze.
10	12 38 35	33. 61	12 41 18	63. 34	8, 9	2	26	---	Hl.	V. ft.
17	10 50 51	268. 14	11 10 41	28. 30	4, 3	3–4	26	---	Hl.	V. unsteady. Windy. Clouded over.
28	11 21 18	118. 43	11 19 32	64. 86	8, 8	3–4	26	---	Hl.	Ft.
29	10 13 43	151. 52	10 12 37	69. 50	7, 8	3–4	26	---	Hl.	V. ft. Haze. Clds. Too ft. to finish.
Aug. 2	9 44 16	279. 55	10 4 38	62. 81	4, 2	4	26	---	Hl.	V. ft. Sat. went out.
1910										
July 5	12 57 3	262. 63	12 57 37	21. 99	4, 4	2–3	26	388	Hl.	Both sats. v. ft. Becoming thick.
9	12 38 39	22. 25	12 40 44	55. 13	4, 4	2	26	388	Hl.	V. ft. Especially distance uncertain.
10	12 59 21	52. 70	13 0 21	54. 16	4, 4	3	26	388	Hl.	
Aug. 5	10 57 17	32. 80	11 16 36	64. 62	2, 3	3	26	388	Hl.	Stopped by haze.

SATELLITES OF URANUS

OBERON—TITANIA—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1912	h m s	°	h m s	″			in.			
July 6	14 8 53	141. 65	14 9 33	34. 65	4, 4	2	26	388	Hl.	Sats. becoming ft.
8	13 25 39	184. 49	13 27 18	25. 99	4, 4	2–3	26	388b	Hl.	
15	13 27 11	286. 13	13 26 58	29. 77	4, 4	2–3	26	388	Hl.	V. ft. Haze.
22	12 14 7	154. 74	12 26 51	69. 60	4, 4	2–3	26	367	Hl.	V. ft. Haze.
Aug. 7	10 41 25	170. 81	10 52 43	28. 18	4, 4	2–3	26	367b	Hl.	V. ft. Haze.
10	11 55 45	258. 68	11 54 27	36. 18	4, 4	2	26	367b	Hl.	Ft. Haze.
12	12 5 10	333. 14	12 3 48	58. 24	4, 4	2–3	26	367b	Hl.	V. ft. Haze.
1913										
June 30	13 17 7	319. 28	13 21 1	58. 10	4, 4	2	26	367b	Hl.	Ft. Haze.
30	14 25 37	320. 84	14 24 10	57. 89	4, 4	2	26	367b	Hl.	
July 23	12 6 49	184. 70	12 9 36	63. 27	4, 4	3	26	367b	Hl.	
23	12 38 58	185. 86	-- -- --	-----	2, 0	3	26	367b	Hl.	Stopped by clds.
26	11 59 5	299. 16	11 58 51	52. 22	4, 4	2	26	367b	Hl.	
26	12 48 19	299. 64	12 49 34	52. 67	4, 4	2	26	367b	Hl.	
Aug. 20	9 20 21	224. 38	9 21 4	56. 80	4, 4	2–3	26	367b	Hl.	Ft.
20	10 19 24	226. 08	10 16 4	56. 11	4, 4	2–3	26	367b	Hl.	
21	11 4 55	273. 69	11 7 31	49. 12	4, 4	---	26	367b	Hl.	Too ft. to continue.
28	10 34 37	149. 78	10 37 37	43. 06	4, 4	2	26	495b	Hl.	Delayed by visitors.
28	11 20 33	149. 75	-- -- --	-----	2, 0	2	26	495b	Hl.	Too ft. to finish.
Sept. 2	9 12 45	237. 61	9 12 53	8. 30	4, 4	2–3	26	388	Hl.	V. ft.
2	10 25 37	239. 28	11 8 0	8. 03	2, 3	2–3	26	388	Hl.	Stopped by haze and clds.
4	9 8 47	229. 27	9 7 43	13. 40	4, 4	2	26	367b	Hl.	
4	10 16 38	228. 54	10 13 51	12. 99	4, 4	2	26	367b	Hl.	
5	10 20 42	261. 73	10 21 46	17. 14	4, 4	2	26	367b	Hl.	
1914										
July 15	14 30 39	92. 30	14 33 41	24. 92	4, 4	3	26	367b	Hl.	
19	12 35 51	175. 48	12 36 16	13. 54	4, 4	3–4	26	367b	Hl.	Both ft.
28	13 47 43	181. 70	13 47 36	64. 45	4, 4	3	26	367b	Hl.	
30	11 45 3	61. 00	11 39 16	45. 36	4, 4	3	26	367b	Hl.	Both v. ft.
Aug. 13	11 44 56	115. 64	11 45 54	7. 71	4, 4	3	26	367b	Hl.	Both v. ft. Haze. Fog.
15	12 1 22	117. 53	12 1 52	13. 63	4, 4	3	26	367b	Hl.	Both v. ft. Occulting strip over planet.
16	11 45 14	143. 37	11 42 40	21. 86	4, 4	2–3	26	367b	Hl.	Both v. ft.
17	11 35 24	163. 46	12 0 37	34. 64	2, 4	2–3	26	367b	Hl.	Stopped by haze.
18	11 10 52	181. 91	11 14 8	41. 96	4, 4	2–3	26	367b	Hl.	Both ft.
19	11 27 6	203. 81	11 25 2	41. 80	4, 4	2	26	367b	Hl.	Both v. ft.
23	11 32 47	351. 71	11 34 58	70. 34	4, 4	3	26	367b	Hl.	Haze.
Sept. 5	10 49 1	24. 15	11 3 44	17. 81	3, 4	2–3	26	367b	Hl.	Both v. ft. Moonlight and haze.
14	8 42 4	188. 64	8 43 6	54. 78	4, 4	2–3	26	367b	Hl.	Stopped by haze. 388 on first two p's.
15	10 8 4	218. 77	10 5 38	47. 34	4, 4	3	26	367b	Hl.	
21	9 36 4	58. 66	9 36 4	48. 08	4, 4	2–3	26	367b	Hl.	Both v. ft. Haze.
1915										
July 6	14 1 33	170. 08	14 0 42	55. 47	4, 4	3	26	367b	Bn.	
8	13 58 25	214. 78	13 58 34	44. 45	4, 4	3–4	26	367b	Bn.	
13	13 34 37	19. 24	13 35 13	59. 89	4, 4	4	26	367b	Bn.	
17	13 7 49	169. 81	13 5 49	59. 39	4, 4	2–3	26	367b	Bn.	
23	15 10 22	344. 30	15 10 22	14. 51	4, 4	4	26	367b	Bn.	
Aug. 10	11 26 26	82. 91	11 27 36	34. 20	4, 4	2	26	367b	Bn.	
12	12 42 10	159. 74	12 43 9	47. 84	4, 4	3	26	367b	Bn.	
14	11 41 19	195. 50	11 42 7	32. 20	4, 4	2–3	26	367b	Bn.	Haze.
Sept. 15	9 47 41	236. 94	9 44 17	19. 60	4, 4	3	26	367b	Hl.	Both ft. Haze.
Oct. 11	7 32 34	209. 54	7 32 15	31. 81	4, 4	2–3	26	367b	Bn.	
12	7 6 27	250. 65	7 7 41	27. 80	4, 4	2	26	367b	Bn.	
25	7 24 26	334. 40	7 21 45	45. 07	4, 4	3–4	26	367b	Bn.	Oberon v. ft. Moonlight
1919										
Aug. 9	14 8 35	77. 53	14 8 50	5. 48	4, 4	3	26	367b	Bn.	Moonlight.

SATELLITES OF URANUS

ARIEL—URANUS

Date	W. M. T.	p	W. M. T.	s	Comp.	See-ing	Inst.	Power	Obsr.	Remarks
1921	h m s	°	h m s	″			in.			
Aug. 29	11 4 8	164. 80	11 39 13	13. 86	2, 4	2	26	495	Hl.	Clouded. Fog. Ariel ft.

TITANIA—UMBRIEL

Date	W. M. T.	p	W. M. T.	s	Comp.	See-ing	Inst.	Power	Obsr.	Remarks
1911										
July 19	11 52 23	161. 66	11 58 36	13. 63	4, 4	2	26	360r	Ep.	Interrupted by clds.
25	12 2 26	114. 50	12 3 1	23. 63	4, 6	3	26	367	Ep.	Interrupted by clds.
27	11 6 30	132. 96	11 9 30	12. 76	6, 8	3	26	367	Ep.	Haze.

OBERON—UMBRIEL

Date	W. M. T.	p	W. M. T.	s	Comp.	See-ing	Inst.	Power	Obsr.	Remarks
1911										
July 27	11 51 42	237. 24	11 52 34	25. 99	6, 6	3	26	495	Ep.	Haze.
31	11 18 27	337. 61	11 17 22	58. 48	6, 7	2	26	495b	Ep.	
Aug. 21	9 19 55	162. 22	9 20 25	23. 39	8, 8	2	26	495	Ep.	
Sept. 13	8 21 17	85. 88	8 23 45	24. 75	8, 9	2	26	495	Ep.	
1912										
Sept. 10	9 41 28	53. 11	9 43 20	26. 67	4, 4	2	26	495b	Bn.	

OBERON—ARIEL

Date	W. M. T.	p	W. M. T.	s	Comp.	See-ing	Inst.	Power	Obsr.	Remarks
1911										
July 31	10 38 59	343. 72	10 40 6	52. 14	6, 6	2	26	495b	Ep.	

TITANIA—ARIEL

Date	W. M. T.	p	W. M. T.	s	Comp.	See-ing	Inst.	Power	Obsr.	Remarks
1911										
Sept. 13	9 5 13	325. 84	9 6 33	17. 32	6, 6	2	26	495	Ep.	
1915										
Aug. 12	11 36 24	26. 55	11 37 40	15. 43	4, 4	2	26	367b	Bn.	
1919										
Aug. 9	11 31 45	180. 40	11 30 23	15. 92	4, 4	3	26	367b	Bn.	Moonlight.

SATELLITE OF NEPTUNE

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1907	h m s	°	h m s	″			in.			
Dec. 27	9 29 47	270. 51	9 29 20	17. 19	6, 6	3	26	388	Hd.	
31	11 45 38	19. 30	11 45 8	11. 72	6, 6	3	26	525	Hd.	
1908										
Jan. 3	11 9 36	197. 64	11 9 27	11. 02	6, 6	1	26	388	Hd.	Ft. Haze.
5	10 25 28	81. 14	10 24 43	16. 11	6, 6	1	26	388	Hd.	Fairly bright.
10	10 31 54	117. 32	10 31 38	15. 52	6, 7	1	26	388	Hd.	
25	9 31 46	285. 53	9 31 38	16. 82	6, 6	1	26	388	Hd.	
Feb. 20	9 25 59	125. 53	9 25 53	14. 38	6, 7	3	26	388	Hd.	
24	9 35 43	259. 86	9 35 52	15. 95	6, 6	1	26	388	Hd.	
Mar. 3	9 8 40	114. 60	9 8 17	15. 44	8, 6	1	26	388	Hd.	
4	9 28 49	72. 94	9 29 14	15. 28	8, 8	1	26	388	Hd.	
9	11 31 33	105. 47	11 31 44	16. 39	6, 8	1	26	388	Hd.	
21	8 5 59	100. 82	8 5 27	16. 39	8, 8	3	26	388	Hd.	
27	7 48 44	96. 25	7 46 14	16. 68	11, 10	2	26	388	Hd.	Interrupted by haze.
Dec. 2	13 12 54	257. 06	13 12 24	15. 96	8, 8	3	26	525	Hl.	Ft. Moonlight. Haze.
7	13 1 25	295. 28	13 18 25	16. 04	4, 3	3	26	525	Hl.	Ft. Moonlight. Stopped by cld. and haze.
13	11 35 29	112. 27	11 37 27	16. 55	9, 8	3	26	525	Hl.	Occasional clds.
26	11 44 4	234. 20	11 47 9	13. 43	8, 8	3	26	388	Hl.	V. ft.
31	13 32 17	272. 42	13 34 41	17. 00	8, 8	3–4	26	525	Hl.	V. ft.
1909										
Jan. 1	13 24 51	218. 28	13 28 13	11. 94	9, 8	3	26	525	Hl.	V. ft. Moonlight.
17	10 34 5	307. 03	10 36 3	15. 99	8, 8	3–4	26	388	Hl.	V. ft.
18	8 37 2	267. 77	8 39 18	17. 02	8, 8	3	26	525	Hl.	Ft.
20	13 56 27	116. 34	13 58 52	16. 31	8, 8	3	26	388	Hl.	Poor at last.
Feb. 10	9 10 54	285. 99	-- -- --	-----	4, 0	3–4	26	388	Hl.	V. ft. Clouded over.
11	11 14 59	234. 58	11 18 50	12. 97	8, 8	3	26	525	Hl.	Ft.
13	13 28 0	96. 16	13 30 16	17. 41	8, 8	3	26	525	Hl.	V. ft. Haze.
17	10 23 52	229. 22	10 26 24	12. 88	8, 8	3	26	525	Hl.	
17	12 54 19	222. 81	12 55 44	11. 97	8, 8	3	26	388	Hl.	Ft.
20	11 18 42	44. 74	11 21 16	12. 76	8, 8	2–3	26	388	Hl.	
25	10 56 47	90. 82	11 1 34	17. 41	8, 8	2–3	26	388	Hl.	
26	10 58 0	35. 40	10 59 10	12. 12	8, 8	2–3	26	388	Hl.	V. ft. Haze.
Mar. 5	10 25 49	307. 01	-- -- --	-----	4, 0	3	26	388	Hl.	Sat. went out. Brt. moonlight, haze, and cld.
11	9 47 15	301. 98	10 20 6	14. 79	4, 7	3–4	26	525	Hl.	Stopped by clds. and haze.
15	8 13 16	79. 76	8 11 50	15. 40	8, 8	2–3	26	525	Hl.	V. ft.
17	7 58 32	299. 58	8 1 20	15. 57	8, 8	3–4	26	525	Hl.	
20	7 49 7	117. 55	7 50 48	15. 18	8, 8	3–4	26	525	Hl.	V. ft.
21	9 58 45	70. 36	10 3 21	14. 89	8, 8	3	26	525	Hl.	Ft. Distances poor.
21	11 19 30	67. 48	11 22 25	15. 08	8, 8	4	26	525	Hl.	
22	8 7 23	1. 98	8 11 13	11. 66	8, 8	3	26	525	Hl.	V. ft. Haze and clds.
23	9 40 25	291. 21	9 39 3	16. 21	8, 8	2–3	26	525	Hl.	Ft. for last 4 angles.
26	7 34 57	113. 65	7 37 13	15. 53	8, 8	2–3	26	525	Hl.	V. ft. Some haze.
Dec. 9	12 33 53	130. 77	12 39 0	14. 59	8, 8	2–3	26	388	Hl.	
10	11 5 31	92. 42	-- -- --	-----	4, 0	2	26	388	Hl.	Too ft. to observe.
16	11 46 12	87. 77	11 53 44	15. 44	8, 8	2–3	26	388	Hl.	V. ft.
17	12 26 53	12. 59	12 56 27	11. 51	4, 8	3	26	388	Hl.	V. ft. Too ft. to finish.
1910										
Jan. 7	12 44 35	156. 39	-- -- --	-----	4, 0	2	26	388	Hl.	V. ft. Clock stopped.
8	9 23 20	111. 94	9 28 3	16. 40	8, 9	2–3	26	388	Hl.	Ft.
8	11 6 44	107. 71	11 21 30	16. 26	8, 8	2	26	388	Hl.	
10	10 18 14	336. 62	10 21 29	12. 18	8, 8	2	26	388	Hl.	
10	13 5 3	328. 07	13 0 30	13. 26	8, 8	2–3	26	388	Hl.	V. ft.
19	12 33 40	139. 26	12 34 34	13. 65	8, 8	2	26	388	Hl.	V. ft. Moonlight.

SATELLITE OF NEPTUNE—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1910	h m s	°	h m s	″			in.			
Jan. 29	8 30 16	272. 48	8 34 35	16. 89	8, 8	3	26	388	Hl.	
29	9 32 45	271. 32	9 31 31	16. 97	8, 8	3	26	388	Hl.	
29	11 26 5	266. 58	11 29 35	16. 69	8, 8	3	26	388	Hl.	V. ft. Moonlight. Beginning to cld.
Feb. 1	11 55 46	83. 31	11 56 16	15. 84	8, 8	2–3	26	---	Hl.	
1	13 41 41	79. 81	14 6 19	16. 08	4, 4	---	26	---	Hl.	
7	9 17 1	84. 14	9 14 40	15. 65	8, 8	2	26	388	Hl.	
7	11 32 44	79. 13	11 37 31	16. 06	8, 8	2	26	388	Hl.	
10	11 48 1	255. 00	11 56 14	14. 93	8, 8	2	26	388	Hl.	
13	10 7 46	77. 05	10 43 46	15. 23	4, 3	3	26	388	Hl.	Distances poor. Hazed over.
18	10 49 26	112. 91	10 54 35	16. 16	8, 9	3	26	388	Hl.	V. ft. Moonlight.
22	11 26 36	243. 09	11 30 57	13. 62	7, 8	3	26	388	Hl.	Too ft. to finish. Moonlight.
25	9 13 6	65. 02	9 40 11	13. 87	4, 4	2–3	26	388	Hl.	V. ft. Moonlight and haze.
25	12 5 39	57. 27	12 8 53	13. 46	8, 8	3	26	388	Hl.	V. ft. Moonlight. Clouded over.
Mar. 3	10 19 52	52. 16	-- -- --	-----	4, 0	2	26	388	Hl.	Ft. Fog. Lights gave out.
4	9 54 14	331. 44	9 54 52	12. 54	8, 8	2–3	26	388	Hl.	V. ft. at last. Fog.
8	9 7 6	100. 57	9 9 37	16. 47	8, 8	3	26	388	Hl.	
8	9 51 50	99. 42	-- -- --	-----	4, 0	3	26	388	Hl.	Clouded.
14	8 44 42	98. 16	9 24 18	16. 36	4, 8	3	26	388	Hl.	V. ft.
15	9 2 19	39. 77	9 12 23	11. 93	8, 8	3	26	388	Hl.	
17	10 7 2	271. 87	-- -- --	-----	4, 0	3	26	388	Hl.	Too ft. to continue.
26	8 18 5	85. 69	8 22 49	16. 06	8, 8	2–3	26	388	Hl.	V. ft. Moonlight.
Apr. 2	9 1 26	7. 08	9 12 11	11. 05	8, 8	2–3	26	388	Hl.	
8	8 23 9	356. 95	8 23 21	11. 15	8, 9	2–3	26	388	Hl.	V. ft.
9	8 11 19	295. 25	8 16 9	15. 74	8, 8	3	26	388	Hl.	Windy.
9	-- -- --	-----	8 52 38	15. 95	0, 8	3	26	388	Hl.	
13	8 29 52	67. 14	8 35 22	13. 85	8, 9	2–3	26	388	Hl.	Ft. Fuzzy. Moonlight.
14	8 37 46	343. 80	8 46 35	11. 42	8, 8	3	26	388	Hl.	V. ft. Poor obsn.
1911										
Jan. 28	10 10 51	286. 34	10 33 34	16. 78	8, 8	2	26	388	Hl.	
Feb. 2	11 52 38	322. 93	11 59 46	13. 51	8, 8	2–3	26	388	Hl.	
2	13 43 22	318. 88	13 47 52	14. 02	8, 8	2	26	388	Bn.	
21	10 20 55	264. 60	11 11 34	15. 47	4, 4	3	26	495p	Bn.	
21	12 4 31	261. 07	12 19 59	15. 11	4, 4	3–4	26	495p	Hl.	
23	7 53 18	128. 98	-- -- --	-----	4, 0	3	26	388	Hl.	V. ft.
23	10 29 11	125. 37	10 59 4	16. 05	4, 4	3	26	388	Bn.	
23	11 19 35	122. 55	11 36 32	16. 08	4, 4	2–3	26	388	Hl.	
24	10 5 59	82. 92	10 24 20	15. 66	8, 8	2	26	388	Hl.	Sat. ft.
24	11 36 33	79. 65	12 3 43	14. 81	8, 9	2–3	26	388	Bn.	
27	9 56 52	259. 13	10 33 4	15. 10	8, 8	3	26	388	Bn.	Haze.
Mar. 1	9 40 25	120. 50	9 57 40	16. 19	8, 8	2	26	388	Hl.	Sat. ft.
1	10 56 1	117. 80	11 18 48	16. 24	8, 8	3	26	388	Bn.	Sat. ft.
2	9 14 4	77. 76	9 43 8	14. 87	4, 2	3	26	388	Bn.	Stopped by clds.
3	9 56 26	359. 60	10 12 20	11. 22	8, 8	2	26	388	Hl.	V. ft. Haze. Interrupted by clds.
4	9 49 20	295. 85	10 12 19	16. 12	8, 8	2–3	26	388	Bn.	
4	11 10 37	295. 10	11 25 21	16. 35	8, 8	2	26	388	Hl.	
8	9 56 24	69. 34	-- -- --	-----	4, 0	3	26	388	Hl.	
8	10 42 9	69. 81	11 8 50	13. 20	4, 4	3	26	388	Bn.	Ft. Moonlight.
10	9 17 13	291. 85	9 36 16	16. 36	8, 8	3	26	388	Hl.	V. ft. Moonlight.
10	10 45 57	290. 00	11 7 59	16. 52	8, 8	3	26	388	Bn.	V. ft. Moonlight.
11	9 2 18	247. 94	9 21 12	13. 93	8, 8	2	26	388	Bn.	Moonlight. Clouded.
16	8 46 21	288. 42	9 6 29	16. 48	8, 8	2–3	26	388	Hl.	Ft. Moonlight.
16	10 21 36	285. 46	10 45 13	16. 74	8, 8	2–3	26	388	Bn.	Ft. Moonlight.
20	9 31 28	56. 31	10 10 30	12. 01	8, 8	3–4	26	495	Bn.	V. ft.
21	8 33 2	333. 56	8 51 16	12. 47	8, 8	2	26	388	Hl.	
21	9 56 52	329. 16	10 16 55	12. 67	8, 8	2	26	388	Bn.	
23	8 42 21	234. 18	9 6 38	12. 70	8, 8	2–4	26	495	Bn.	Haze about 9 h.
24	9 8 41	150. 77	9 31 17	13. 35	8, 8	2	26	388	Hl.	V. ft.

SATELLITE OF NEPTUNE—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1911	h m s	°	h m s	″			in.			
Mar. 24	10 43 49	146. 30	11 2 42	13. 34	8, 8	2	26	388	Bn.	
25	8 33 7	102. 59	8 56 37	16. 59	8, 8	2	26	367	Bn.	V. ft.
25	10 11 19	99. 62	10 31 53	16. 69	8, 8	3	26	388	Hl.	Ft.
28	8 12 45	279. 84	8 31 4	16. 45	8, 8	3–4	26	388	Hl.	
28	9 58 17	275. 42	10 21 57	16. 44	8, 8	3–4	26	388	Bn.	
30	8 55 50	142. 24	9 16 35	13. 61	8, 8	3	26	388	Bn.	
30	10 3 21	139. 10	-- -- --	-----	4, 0	3	26	388	Hl.	Stopped by haze and cld.
31	8 12 42	96. 17	8 35 4	16. 46	8, 8	2	26	495p	Hl.	
31	9 48 55	94. 15	10 16 17	16. 29	8, 9	3	26	495	Hl.	V. ft. for last half of *s*. Clds.
Dec. 18	12 18 21	245. 80	12 24 57	13. 20	4, 4	3	26	367p	Bn.	Illumination unsteady.
18	12 51 38	243. 98	12 52 20	13. 16	4, 4	3	26	367p	Bn.	
19	12 56 7	160. 40	12 59 3	12. 41	4, 4	3	26	367	Bn.	
19	13 21 29	157. 40	13 21 19	12. 66	4, 4	3	26	367	Bn.	
1912										
Jan. 10	11 25 59	273. 07	11 27 26	16. 42	4, 4	3	26	367	Bn.	
10	11 55 25	271. 16	11 56 58	16. 11	4, 4	3	26	367	Bn.	
10	13 2 17	269. 42	13 3 40	16. 03	4, 4	3	26	367	Bn.	
10	13 26 22	268. 40	13 25 57	15. 93	4, 4	3	26	367	Bn.	
13	10 4 18	93. 59	10 3 27	15. 93	4, 5	4	26	388	Bn.	V. ft.
13	10 31 10	91. 72	10 31 44	16. 81	4, 4	4	26	388	Bn.	V. ft.
19	10 6 17	88. 59	10 7 50	15. 96	4, 4	2	26	388	Bn.	
19	10 33 40	88. 21	10 33 28	15. 81	4, 4	2	26	388	Bn.	
19	11 22 39	86. 40	11 22 2	15. 63	4, 4	2	26	388	Bn.	
19	12 14 41	84. 17	12 16 8	15. 41	4, 4	2	26	388	Bn.	
20	10 48 38	15. 40	10 49 0	11. 06	4, 4	2	26	388	Bn.	
20	11 26 51	13. 13	11 25 32	11. 09	4, 4	2	26	388	Bn.	
20	12 45 1	7. 57	12 46 11	11. 04	4, 4	2	26	388	Bn.	
20	13 14 44	5. 29	13 14 33	11. 28	4, 4	2	26	388	Bn.	
21	10 37 50	306. 05	10 39 50	15. 98	4, 4	3	26	388	Bn.	
21	11 6 26	305. 65	11 6 12	15. 94	4, 4	3	26	388	Bn.	
22	9 52 20	266. 03	9 53 40	15. 59	4, 4	3	26	495	Bn.	
22	10 20 37	264. 76	10 22 9	15. 18	4, 4	3	26	495	Bn.	
22	11 2 24	262. 16	11 4 6	15. 19	4, 4	3	26	388	Bn.	
22	11 27 50	260. 65	11 27 58	15. 05	4, 4	3	26	388	Bn.	
24	10 22 28	123. 70	10 25 47	15. 88	4, 4	3	26	388	Bn.	
24	10 46 57	122. 86	10 48 9	16. 09	4, 4	3	26	388	Bn.	
24	11 56 39	121. 02	11 57 23	16. 72	4, 4	3	26	388	Bn.	
24	12 27 9	120. 81	12 26 47	16. 37	4, 4	3	26	388	Bn.	
27	12 12 1	297. 04	12 16 36	16. 80	4, 4	3–4	26	388	Bn.	
27	12 51 5	297. 12	12 52 38	16. 74	4, 4	3–4	26	388	Bn.	Interrupted by clds.
Feb. 2	11 20 35	293. 69	11 19 10	16. 59	4, 4	3	26	388	Bn.	Ft. Moonlight.
2	11 58 33	292. 86	12 0 54	16. 90	4, 4	3	26	388	Bn.	
5	11 16 19	112. 00	11 18 42	16. 83	4, 4	4	26	388	Bn.	Stopped by haze and clds.
6	9 37 14	69. 78	9 40 16	13. 86	4, 4	3–4	26	388	Bn.	
6	10 4 2	69. 10	10 5 4	13. 77	4, 4	3–4	26	388	Bn.	
6	11 43 45	64. 64	11 48 28	13. 39	4, 4	3–4	26	388	Bn.	
6	12 22 52	63. 13	12 24 39	12. 95	4, 4	3–4	26	388	Bn.	Interrupted by haze.
8	10 55 54	289. 51	10 56 5	16. 76	4, 4	3–4	26	388	Bn.	
8	11 31 10	288. 58	11 32 4	17. 02	4, 4	3–4	26	388	Bn.	
9	11 15 57	239. 99	11 14 14	13. 44	4, 4	4	26	388	Bn.	
9	12 5 44	237. 69	12 4 26	12. 94	4, 4	4	26	388	Bn.	
13	10 37 32	333. 90	10 40 11	12. 71	4, 4	3	26	388	Bn.	
13	11 10 33	332. 99	11 11 38	12. 67	4, 4	3	26	388	Bn.	
13	12 18 59	329. 37	12 18 37	13. 06	4, 4	3	26	388	Bn.	Too ft. to finish.
14	9 13 48	287. 30	9 16 25	16. 79	4, 4	3	26	388	Bn.	Ft. Haze.

SATELLITE OF NEPTUNE—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1912	h m s	°	h m s	″			in.			
Feb. 14	9 41 50	287. 11	9 43 6	16. 81	4, 4	3	26	388	Bn.	
14	10 48 54	284. 87	10 50 36	16. 72	4, 4	2–3	26	388	Bn.	Ft. Haze.
14	11 19 10	283. 95	11 21 30	16. 38	4, 4	2–3	26	388	Bn.	
17	8 59 14	105. 98	9 0 56	17. 00	4, 4	3	26	388	Bn.	
17	9 24 22	105. 09	9 24 58	16. 89	4, 4	3	26	388	Bn.	
17	10 17 20	103. 44	10 17 46	16. 97	4, 4	3	26	388	Bn.	
17	10 43 1	103. 82	10 44 29	16. 88	4, 4	3	26	388	Bn.	
23	7 48 51	102. 78	7 51 2	17. 07	4, 4	3	26	388	Bn.	
23	8 19 51	101. 81	8 21 37	16. 80	4, 4	3	26	388	Bn.	
23	10 39 49	97. 92	10 39 29	16. 63	4, 4	3	26	388	Bn.	
23	11 10 33	97. 30	11 10 35	16. 69	4, 4	3	26	388	Bn.	
27	10 53 0	214. 49	10 54 16	11. 18	4, 4	2	26	388	Bn.	
27	11 26 57	211. 92	11 27 45	11. 21	4, 4	2	26	388	Bn.	
28	10 43 50	135. 43	10 45 1	14. 50	4, 4	3	26	388	Bn.	V. ft. Moonlight. Stopped by clds.
Mar. 2	9 57 25	313. 74	9 55 52	14. 62	4, 4	3	26	388	Bn.	V. ft. Moonlight.
2	10 32 46	312. 28	10 32 48	14. 86	4, 4	3	26	388	Bn.	
7	9 58 42	21. 03	10 0 33	10. 76	4, 4	2–3	26	388	Bn.	Clock ran badly.
7	10 35 21	18. 78	10 35 20	10. 78	4, 4	2–3	26	388	Bn.	Interrupted by haze.
10	10 11 43	193. 43	10 15 15	11. 31	4, 5	3–4	26	388	Bn.	
10	10 49 22	191. 51	10 51 20	11. 14	4, 4	3–4	26	388	Bn.	Interrupted by clds. Clock running slow.
13	9 29 33	11. 85	9 29 39	10. 86	4, 4	3–4	26	388	Bn.	V. ft.
13	10 2 33	9. 30	10 2 48	10. 93	4, 4	3–4	26	388	Bn.	
16	10 2 3	182. 34	10 1 40	11. 06	4, 4	2	26	388	Bn.	
16	10 36 43	180. 87	10 39 43	11. 23	4, 4	2	26	388	Bn.	
17	9 56 46	119. 65	9 57 34	16. 09	4, 4	2	26	388	Bn.	
17	10 27 4	118. 68	10 28 22	16. 22	4, 4	2	26	388	Bn.	
18	9 46 31	77. 12	9 47 32	14. 61	4, 4	2	26	388	Bn.	
18	10 15 38	76. 35	10 18 25	14. 35	4, 4	2	26	388	Bn.	
29	9 11 22	110. 81	9 16 40	16. 52	4, 4	3–4	26	367	Bn.	Clds. Moonlight. Windy. Haze.
29	9 43 6	110. 23	9 44 34	16. 52	4, 4	3–4	26	367	Bn.	
31	8 3 43	345. 16	8 2 8	11. 85	4, 4	3–4	26	367	Bn.	Moonlight.
31	8 41 1	342. 54	8 40 8	11. 90	4, 4	3–4	26	367	Bn.	
Apr. 6	8 34 1	334. 06	8 34 54	12. 44	4, 4	3	26	367	Bn.	
6	9 6 12	332. 98	9 3 46	12. 34	4, 4	3	26	367	Bn.	Interrupted by clds.
9	7 48 57	151. 47	7 48 29	13. 34	4, 4	4	26	367	Bn.	
9	8 34 49	148. 84	8 34 29	13. 11	4, 4	4	26	367	Bn.	
10	8 50 36	102. 22	8 53 18	16. 49	4, 4	3	26	388	Bn.	
10	9 24 6	101. 12	9 24 40	16. 46	4, 4	3	26	388	Bn.	
11	8 22 19	50. 75	8 24 53	12. 34	4, 4	3–4	26	388	Bn.	
11	8 57 57	48. 32	9 0 4	12. 04	4, 4	3–4	26	388	Bn.	
Dec. 9	13 6 21	311. 74	13 8 27	16. 01	4, 5	4	26	388	Hl.	
9	13 57 32	310. 84	13 56 21	16. 09	5, 4	4	26	388	Hl.	
13	12 44 12	89. 33	12 42 11	15. 24	4, 4	2–3	26	388	Hl.	
13	13 23 23	87. 93	13 28 1	15. 14	4, 4	2–3	26	388	Hl.	
19	13 1 21	83. 53	12 55 38	14. 72	4, 4	3–4	26	388	Hl.	V. ft. Haze. Moonlight.
19	13 47 11	82. 04	13 48 55	14. 37	4, 5	3–4	26	388	Hl.	
28	11 45 0	253. 93	11 45 54	13. 90	4, 4	3	26	388	Hl.	
28	12 24 33	255. 22	12 27 1	13. 80	4, 4	3	26	388	Hl.	
28	14 18 1	246. 59	14 20 34	12. 88	4, 4	2–3	26	388	Hl.	Ft. Difficult. Moonlight.
28	15 5 41	245. 14	15 3 57	13. 27	4, 4	2–3	26	388	Hl.	
30	12 15 43	118. 22	12 17 27	16. 72	4, 4	3	26	388	Hl.	V. ft.
30	12 55 7	114. 19	12 56 16	16. 72	4, 4	3	26	388	Hl.	
1913										
Jan. 1	10 33 44	349. 48	10 28 58	12. 15	4, 4	2–3	26	388	Hl.	Ft. Mist and fog.
1	11 32 40	347. 94	11 28 21	12. 16	4, 4	2–3	26	388	Hl.	
8	11 49 14	287. 65	11 50 22	17. 26	4, 4	3	26	388	Hl.	

SATELLITE OF NEPTUNE—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1913	h m s	°	h m s	"			in.			
Jan. 8	13 13 12	286. 27	13 13 12	17. 03	4, 5	3	26	388	Hl.	
9	13 46 48	229. 72	13 52 56	11. 51	4, 4	2	26	388	Hl.	Delayed by clds.
14	13 42 43	280. 55	13 50 0	16. 84	4, 4	2	26	388	Hl.	
14	14 20 56	277. 98	14 21 2	16. 65	4, 4	2	26	388	Hl.	
14	14 54 35	276. 23	14 58 1	16. 56	4, 4	2	26	388	Hl.	
14	15 26 6	276. 47	15 25 13	16. 41	4, 4	2	26	388	Hl.	Ft. at last. Haze.
Feb. 4	11 25 50	86. 76	11 26 32	15. 16	4, 4	3	26	388	Hl.	
4	11 47 42	85. 36	12 5 30	14. 90	2, 4	3	26	388	Hl.	Stopped by clds.
6	11 10 15	304. 29	11 10 9	16. 43	4, 4	3–4	26	388	Hl.	
6	11 43 12	303. 28	11 43 12	16. 54	4, 4	3–4	26	388	Hl.	
7	9 49 9	264. 94	9 51 25	15. 71	4, 4	3–4	26	388	Hl.	
7	10 26 55	264. 27	10 28 55	15. 30	4, 4	3–4	26	388	Hl.	
12	11 9 58	300. 64	11 12 34	16. 75	4, 4	3–4	26	388	Hl.	Windy.
12	11 44 43	297. 22	11 44 9	16. 61	4, 4	3–4	26	388	Hl.	
13	8 26 53	262. 01	8 26 40	14. 99	4, 4	3–4	26	388	Hl.	Ft. Haze.
13	9 12 36	261. 19	9 12 54	14. 80	4, 5	3–4	26	388	Hl.	
15	10 42 59	118. 26	10 25 24	16. 22	4, 4	2–3	26	388	Hl.	V. ft. Moonlight. Haze.
15	11 39 10	115. 93	11 39 4	16. 50	4, 4	2–3	26	388	Hl.	
18	10 16 39	296. 06	10 16 35	17. 12	4, 4	2–3	26	388	Hl.	V. ft. Moonlight. Haze.
18	10 56 25	294. 43	10 58 36	17. 15	4, 5	2–3	26	388	Hl.	
25	9 59 36	243. 69	9 59 51	13. 37	4, 4	2	26	388	Hl.	
25	10 42 11	240. 91	10 43 36	13. 09	4, 4	2	26	388	Hl.	
28	7 57 41	66. 50	7 59 7	13. 66	4, 4	3–4	26	388	Bn.	
28	8 23 17	65. 26	8 23 58	12. 69	4, 4	3–4	26	388	Bn.	
28	9 59 48	61. 34	10 2 9	13. 06	4, 4	3	26	388	Bn.	
28	10 22 49	59. 66	10 22 47	11. 81	4, 4	3	26	388	Bn.	
Mar. 5	10 59 40	101. 96	11 1 10	16. 37	4, 4	3–4	26	388	Bn.	
5	11 19 57	102. 20	11 22 30	16. 23	4, 4	3–4	26	388	Bn.	Thin clds. for distances.
6	10 3 18	51. 11	10 4 8	11. 52	4, 4	3–4	26	388	Bn.	
6	10 27 33	50. 22	10 29 4	12. 18	4, 4	3–4	26	388	Bn.	
7	8 4 20	333. 59	8 5 49	13. 55	4, 4	3	26	388	Bn.	
7	8 34 13	331. 61	8 36 39	12. 79	4, 4	3	26	388	Bn.	
7	10 10 3	327. 25	10 18 30	14. 31	2, 2	3	26	388	Bn.	Driving clock stopped.
8	7 48 13	285. 39	7 48 47	16. 69	4, 4	2	26	388	Bn.	
8	8 4 12	285. 57	8 4 27	16. 78	4, 4	2	26	388	Bn.	Interrupted by clds.
18	10 14 28	29. 53	10 14 29	10. 83	4, 4	2	26	388	Bn.	
18	10 34 4	27. 72	10 33 56	11. 04	4, 4	2	26	388	Bn.	
20	7 59 55	275. 70	8 0 30	16. 33	4, 4	2	26	388	Bn.	
20	8 18 40	274. 72	8 20 42	16. 03	4, 4	2	26	388	Bn.	
20	9 12 30	272. 83	9 14 8	16. 00	4, 4	2	26	388	Bn.	
20	9 29 16	272. 37	9 29 38	15. 99	4, 4	2	26	388	Bn.	
22	9 47 37	132. 15	9 47 39	14. 93	4, 4	3	26	388	Bn.	Moonlight.
22	10 6 43	131. 42	10 6 57	15. 31	4, 4	3	26	388	Bn.	
24	9 23 20	23. 16	9 27 0	10. 92	4, 4	4	26	388	Bn.	V. ft.
24	9 54 4	21. 41	9 53 50	10. 69	4, 5	4	26	388	Bn.	
28	7 53 19	129. 72	7 54 27	15. 20	4, 4	2	26	388	Bn.	
28	8 13 21	129. 20	8 13 2	15. 49	4, 4	2	26	388	Bn.	
28	10 12 56	125. 03	10 13 12	15. 61	4, 4	2	26	388	Bn.	
28	10 32 22	124. 19	10 33 28	15. 94	4, 4	2	26	388	Bn.	
29	8 6 16	86. 22	8 7 24	15. 04	4, 4	2	26	388	Bn.	
29	8 25 13	85. 95	8 26 59	15. 21	4, 4	2	26	388	Bn.	
29	9 3 46	84. 10	9 4 8	14. 93	4, 5	2	26	388	Bn.	
29	9 24 6	83. 58	9 25 51	14. 38	4, 5	2	26	388	Bn.	
31	8 11 18	306. 75	8 12 43	15. 65	4, 4	3	26	388	Bn.	
31	8 32 31	305. 60	8 32 56	15. 52	4, 4	3	26	388	Bn.	

SATELLITE OF NEPTUNE—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1913	h m s	°	h m s	"			in.			
Mar. 31	9 16 58	304. 32	9 17 5	16. 07	4, 4	3	26	388	Bn.	
31	9 39 33	303. 70	9 39 54	16. 17	4, 4	3	26	388	Bn.	
Apr. 1	8 38 9	262. 99	8 37 2	15. 10	4, 4	3	26	388	Bn.	
1	8 57 56	261. 67	8 57 46	14. 81	4, 4	3	26	388	Bn.	
1	9 42 53	259. 27	9 44 29	14. 30	4, 4	3	26	388	Bn.	
1	10 2 11	259. 09	10 3 2	14. 49	4, 4	3	26	388	Bn.	
5	7 54 54	5. 54	7 55 7	11. 00	4, 4	2	26	388	Bn.	
5	8 19 46	3. 58	8 20 38	11. 25	4, 4	2	26	388	Bn.	
7	7 49 36	257. 90	7 50 0	14. 45	4, 4	2	26	388	Bn.	
7	8 12 9	256. 91	8 14 31	14. 14	4, 4	2	26	388	Bn.	
17	9 34 51	338. 84	9 34 3	12. 32	4, 4	2	26	388	Bn.	Moonlight.
17	10 0 42	337. 19	10 0 43	12. 49	4, 4	2	26	388	Bn.	
19	8 36 12	241. 22	8 35 52	13. 04	4, 4	3	26	388	Bn.	V. ft. Moonlight.
19	8 59 40	240. 58	8 59 45	12. 36	4, 5	3	26	388	Bn.	
21	8 30 32	107. 42	8 30 55	16. 19	4, 4	2	26	388	Bn.	
21	8 49 19	106. 77	8 49 58	16. 05	4, 4	2	26	388	Bn.	
22	8 20 34	57. 97	8 20 9	12. 04	4, 4	2	26	388	Bn.	
22	8 39 20	57. 16	8 39 20	12. 15	4, 5	2	26	388	Bn.	
24	7 58 15	285. 54	7 58 56	16. 52	4, 4	2	26	388	Bn.	
24	8 19 0	285. 90	8 20 15	16. 52	4, 4	2	26	388	Bn.	
May 1	8 19 43	223. 49	8 20 46	11. 25	4, 4	2	26	388	Bn.	
1	8 47 15	221. 86	8 48 42	10. 74	4, 4	2	26	388	Bn.	
3	8 9 44	98. 38	8 10 22	15. 48	4, 4	2	26	388	Bn.	
3	8 31 44	97. 64	8 32 50	15. 89	4, 4	2	26	388	Bn.	
8	8 20 54	135. 29	8 21 20	13. 69	4, 4	3–4	26	388	Bn.	V. ft. Haze.
8	8 49 20	134. 88	8 47 37	14. 52	4, 4	3–4	26	388	Bn.	
1918										
Dec. 17	12 42 36	269. 97	12 45 55	13. 32	4, 4	3	26	388	Hl.	Moonlight. Haze.
17	13 28 59	266. 17	13 32 48	13. 35	4, 4	3	26	388	Hl.	
18	13 14 55	181. 46	13 12 2	11. 07	4, 4	2	26	388	Hl.	Ft. Moonlight. Haze.
18	14 35 31	177. 18	14 34 31	12. 38	5, 4	3	26	388	Hl.	
19	12 40 17	131. 62	12 40 26	16. 75	4, 4	2–3	26	388	Hl.	V. ft. Moonlight. Haze.
19	13 18 6	130. 09	13 19 9	16. 97	4, 4	2–3	26	388	Hl.	Better at last.
28	13 47 50	301. 10	13 50 23	17. 16	4, 4	3	26	388	Hl.	
28	15 26 18	298. 34	15 29 7	16. 57	4, 4	3	26	388	Hl.	Images very poor for last p's.
29	12 7 26	257. 97	12 11 43	12. 94	4, 4	3–4	26	388	Hl.	Intervals of very bad seeing.
29	13 57 36	249. 31	13 58 17	11. 90	4, 4	3–4	26	388	Hl.	
1919										
Jan. 6	12 39 59	117. 42	12 47 50	16. 46	4, 4	3	26	388	Hl.	
6	13 33 31	115. 89	13 31 24	16. 28	4, 4	3	26	388	Hl.	
20	11 6 19	325. 55	11 7 20	15. 16	4, 4	2–3	26	388	Hl.	Also power 367. Moisture on eye-
20	11 52 47	323. 66	11 56 36	15. 32	4, 4	2–3	26	388	Hl.	pieces.
21	10 28 18	286. 90	10 28 45	15. 93	4, 4	3	26	388	Hl.	Stopped by clds. and fog.
24	10 42 24	105. 88	10 54 33	15. 52	4, 4	3–4	26	388	Hl.	Windy. Pointings difficult.
24	12 2 16	104. 34	12 8 21	14. 95	4, 4	3–4	26	388	Hl.	
26	11 41 41	319. 82	11 41 53	15. 49	4, 4	3	26	388	Hl.	
26	13 22 43	316. 78	13 21 56	16. 57	4, 4	3	26	388	Hl.	
27	10 31 42	282. 74	10 32 56	15. 61	4, 4	2	26	388	Hl.	Haze. Also power 367. Eyepieces
27	11 11 56	281. 49	11 12 51	14. 97	4, 4	2	26	388	Hl.	fogged occasionally.
29	13 31 21	136. 14	13 30 51	16. 54	4, 4	3	26	388	Hl.	
29	14 19 52	134. 82	14 19 39	16. 45	4, 4	3	26	388	Hl.	
30	10 45 32	100. 48	10 49 7	14. 71	4, 4	3	26	388	Hl.	Haze. Too ft. to continue.
31	13 25 36	9. 60	13 28 21	11. 86	4, 4	2–3	26	388	Hl.	
31	14 20 10	7. 36	14 27 33	11. 64	4, 6	2–3	26	388	Hl.	Haze at last.
Feb. 1	11 35 14	314. 76	11 35 12	16. 59	4, 4	3	26	388	Hl.	
1	13 17 44	311. 43	13 17 9	16. 62	4, 4	3	26	388	Hl.	
5	12 58 51	90. 81	13 4 13	13. 37	4, 4	3–4	26	388	Hl.	
5	14 8 27	84. 59	14 6 55	12. 85	4, 4	3–4	26	388	Hl.	

SATELLITE OF NEPTUNE—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1919	h m s	°	h m s	"			in.			
Feb. 6	10 57 16	8. 78	11 6 55	11. 18	4, 4	3	26	367	Hl.	
6	12 43 25	3. 48	12 46 24	11. 96	4, 4	3	26	367	Hl.	
10	10 15 16	130. 18	10 16 15	17. 01	4, 4	3	26	388	Hl.	Ft. Moonlight.
10	11 8 30	128. 36	11 10 1	17. 02	4, 4	3	26	388	Hl.	
19	9 39 43	303. 94	9 41 43	16. 74	4, 4	3	26	388	Hl.	
19	10 26 29	302. 81	10 27 3	16. 86	4, 4	3	26	388	Hl.	
24	9 42 41	345. 14	9 44 17	12. 63	4, 4	2–3	26	388	Hl.	Becoming hazy. Eyepiece fogged occasionally.
24	10 25 6	344. 27	10 26 14	12. 64	4, 4	2–3	26	367	Hl.	First two p's with power 388.
26	10 58 11	240. 64	11 1 3	11. 12	4, 4	3	26	388	Hl.	Eyepiece fogged occasionally.
26	11 53 30	237. 47	12 1 12	11. 21	4, 4	3	26	367	Hl.	First p with power 388.
Mar. 3	9 49 17	293. 11	9 45 15	17. 16	4, 5	3	26	388	Hl.	Power 367 for last half. Good at first,
24	9 1 34	98. 39	9 0 32	14. 53	4, 4	3	26	388	Hl.	then v. ft. Eyepiece fogged.
24	9 37 48	96. 82	9 37 37	13. 84	4, 5	3	26	388	Hl.	Stopped by haze.
25	9 3 8	19. 18	9 5 34	9. 96	4, 4	3	26	367	Hl.	
25	9 43 49	15. 20	9 42 55	10. 37	4, 5	3–4	26	367	Hl.	
Apr. 2	8 29 15	267. 78	8 28 19	13. 34	4, 4	3–4	26	388	Hl.	
2	9 23 8	263. 52	9 26 36	13. 46	4, 4	3–4	26	388	Hl.	
Nov. 5	16 0 18	275. 34	16 2 38	13. 80	4, 4	4	26	367	Hl.	Moonlight at first.
5	16 46 21	273. 53	16 44 20	13. 23	4, 4	3	26	367	Hl.	
16	15 43 42	307. 85	15 45 3	16. 65	4, 4	2–3	26	367	Hl.	Foggy. Delayed by eyepieces fogging. Also power 388.
22	15 29 18	304. 19	15 33 0	16. 84	4, 4	3–4	26	388	Hl.	Clds.
24	14 46 9	166. 54	14 47 47	12. 97	4, 4	2–3	26	388	Hl.	Fog and haze. Also power 367.
24	15 45 10	163. 57	15 46 18	13. 22	4, 4	2–3	26	388	Hl.	
Dec. 1	14 10 10	118. 52	14 11 51	16. 52	4, 4	2	26	388	Hl.	Stopped by haze.
3	15 8 50	334. 92	15 13 8	13. 76	4, 4	2–3	26	388	Hl.	Delayed by moonlight.
4	15 18 9	294. 56	15 22 51	16. 52	4, 4	2	26	388	Hl.	Moonlight. Haze. Also power 367.
1920										
Jan. 13	10 52 47	307. 82	10. 56 14	16. 91	4, 4	3–4	26	388	Hl.	
13	11 42 50	303. 83	11 43 46	16. 84	4, 4	3–4	26	388	Hl.	
29	10 34 16	113. 82	10 34 24	16. 60	4, 4	3	26	388	Hl.	Ft. Moonlight. Haze.
29	11 14 58	113. 23	11 19 16	16. 21	4, 4	3	26	388	Hl.	
Feb. 13	11 55 26	278. 59	11 54 54	14. 49	4, 4	2–3	26	388	Hl.	Ft.
13	12 28 6	279. 04	12 49 4	13. 96	2, 4	2–3	26	388	Hl.	Object glass fogged.
19	9 36 4	277. 31	9 42 38	14. 94	4, 4	3	26	367	Hl.	Ft.
19	10 29 36	275. 75	10 29 6	14. 50	4, 4	3	26	367	Hl.	
25	10 8 13	268. 93	10 8 33	13. 84	4, 4	3–4	26	388	Hl.	Ft.
25	11 2 43	267. 22	10 59 41	13. 32	4, 4	3–4	26	388	Hl.	
Mar. 21	9 57 0	153. 27	9 43 15	13. 76	4, 4	2–3	26	388	Hl.	V. ft. Haze. Wires flashing. Poor obsn.
22	9 40 49	114. 01	9 24 12	15. 85	4, 4	3	26	388	Hl.	Ft. Delayed by aurora.
22	10 45 24	111. 80	10 41 50	16. 00	4, 4	3	26	388	Hl.	
23	10 17 20	45. 39	10 19 36	10. 29	4, 4	2–3	26	388	Hl.	Ft. Wires flashing. Stopped by haze.
24	11 24 47	326. 31	11 26 12	15. 23	4, 4	3	26	388	Hl.	Too poor to continue.
Apr. 10	9 29 12	15. 36	9 29 7	10. 50	4, 4	2–3	26	388	Hl.	Used blue wires.
May 4	8 57 37	338. 61	8 56 55	13. 62	4, 4	2–3	26	388	Hl.	Haze. Too faint to continue.
Dec. 14	13 45 23	301. 80	13 48 22	16. 49	4, 4	3	26	388	Hl.	
17	13 45 26	120. 32	13 50 50	15. 98	4, 4	3	26	388	Hl.	Haze.
20	13 5 55	298. 58	13 11 13	16. 44	4, 4	2	26	388	Hl.	Moonlight.
31	13 51 27	325. 24	13 49 11	15. 38	4, 4	2	26	388	Hl.	Haze.
1921										
Jan. 3	11 37 42	147. 20	11 36 18	15. 24	4, 4	3–4	26	388	Hl.	
6	11 57 44	322. 97	11 47 33	15. 40	4, 4	3	26	388	Hl.	V. ft. Haze. Clds.
12	12 18 56	317. 45	12 21 2	16. 39	4, 4	3	26	388	Hl.	
27	10 30 40	129. 59	10 29 46	16. 70	4, 4	3–4	26	388	Hl.	
Feb. 11	9 18 4	299. 10	9 18 45	16. 93	4, 6	3	26	495	Hl.	
14	10 33 9	117. 00	10 33 4	16. 40	4, 4	3	26	495	Hl.	

SATELLITE OF NEPTUNE—Continued

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Inst.	Power	Obsr.	Remarks
1921	h m s	°	h m s	"			in.			
Feb. 16	11 51 35	329. 61	11 50 8	15. 40	5, 6	3	26	388	Hl.	
25	9 21 15	146. 71	9 32 38	15. 74	4, 5	3	26	495	Hl.	
Mar. 1	8 41 25	285. 42	8 45 42	15. 84	4, 4	2–3	26	495	Hl.	Clds at first.
7	9 1. 51	278. 45	9 0 26	14. 55	4, 4	2–3	26	367	Hl.	Ft. Haze.
13	12 24 6	261. 53	12 34 9	12. 38	4, 4	3	26	770	Hl.	First two p's with 495.
18	10 36 46	307. 12	10 40 7	17. 38	4, 4	3	26	495	Hl.	Ft. Haze. Moonlight.
25	8 13 2	258. 49	8 19 20	12. 18	4, 4	3	26	495	Hl.	
29	8 15 6	344. 74	8 15 13	13. 36	4, 4	3	26	495	Hl.	
Apr. 1	9 4 34	161. 29	9 1 45	13. 40	4, 4	3	26	495	Hl.	
4	9 2 47	336. 39	9 1 46	14. 17	4, 4	2–3	26	495	Hl.	
5	9 18 43	295. 17	9 20 36	16. 42	4, 4	3	26	495	Hl.	
6	8 30 20	235. 47	8 30 30	10. 57	4, 4	3	26	495	Hl.	Ft.
11	9 21 17	290. 08	9 28 0	16. 00	4, 4	3	26	495	Hl.	
Dec. 19	14 10 15	311. 54	14 12 30	16. 43	4, 4	4	26	495	B.	Sat. ft. Haze.
1922										
Jan. 30	11 7 11	281. 00	11 8 59	13. 82	4, 5	3	26	495	B.	
Mar. 17	9 7 34	323. 37	9 9 1	16. 62	4, 4	3–4	26	495	Hl.	
23	8 42 13	319. 76	8 36 17	16. 04	4, 4	2	26	495	Hl.	Ft. at last. Haze.
Apr. 20	9 26 47	57. 80	9 28 36	10. 08	4, 4	3–4	26	495	Hl.	
22	9 17 2	295. 01	9 19 33	15. 77	4, 4	3	26	495	B.	
1923										
Feb. 21	9 54 42	316. 75	9 59 48	16. 92	4, 4	3	26	495	Hl.	Haze. Ft.
Mar. 5	9 02 54	309. 00	9 2 49	16. 75	4, 4	3	26	495	Hl.	
10	12 12 31	340. 68	12 9 8	14. 34	4, 4	3–4	26	495	Hl.	
14	8 51 51	124. 73	8 51 20	16. 37	4, 4	3	26	495	Hl.	
17	8 37 59	301. 69	8 37 15	16. 76	4, 4	3	26	495	Hl.	
Apr. 6	8 51 41	141. 95	8 50 23	15. 92	4, 4	2–3	26	495	Hl.	Sat. ft.
9	8 9 46	321. 13	8 8 39	16. 57	4, 4	3	26	495	Hl.	
20	8 38 9	359. 61	8 36 11	11. 68	4, 4	3	26	495	Hl.	
21	8 45 9	309. 34	8 43 7	16. 34	4, 4	4	26	495	Hl.	Windy.
May 3	8 31 10	303. 91	8 33 32	16. 45	4, 4	2–3	26	495	Hl.	Clark Microm. II. Sat. ft.
6	8 48 49	121. 20	8 48 49	15. 80	4, 4	2–3	26	495	Hl.	Clark Microm. II.
19	8 51 42	32. 19	8 55 45	9. 24	4, 4	2–3	26	495	Hl.	Haze. Ft.
1925										
Feb. 18	9 42 17	347. 58	9 36 41	13. 36	4, 4	2	26	495	Hl.	
18	10 49 9	345. 98	10 50 18	13. 46	4, 4	2	26	495	Hl.	
20	9 27 19	257. 65	9 24 26	10. 86	4, 4	3	26	495	Hl.	Haze. Ft.
24	10 24 20	340. 71	10 23 48	14. 24	4, 4	3–2	26	495	Hl.	Delayed by clds.
24	11 33 52	339. 54	11 19 50	14. 33	6, 4	3–2	26	495	Hl.	Delayed by clds.
Mar. 15	11 9 29	287. 44	11 15 4	14. 09	4, 4	2–3	26	495	Hl.	
20	9 56 31	322. 48	9 58 6	16. 65	4, 4	2	26	495	Hl.	
20	10 40 33	321. 90	10 39 41	16. 67	4, 4	2–3	26	495	Hl.	
Apr. 6	8 15 2	353. 71	8 12 14	11. 65	4, 4	2	26	495	Hl.	Ft.
7	8 11 29	311. 95	8 14 55	16. 80	4, 4	3	26	495	Hl.	
13	8 39 31	308. 04	8 40 4	16. 03	4, 4	3–4	26	495	Hl.	Windy.
1926										
Jan. 19	12 56 48	341. 54	12 55 24	14. 39	4, 4	3	26	495	Hl.	
Mar. 5	8 34 3	134. 99	8 36 1	15. 99	4, 4	2–3	26	367	Hl.	Ft.
13	10 16 16	340. 99	10 15 52	14. 25	4, 5	2–3	26	495	Hl.	
Apr. 15	9 23 27	138. 23	9 22 59	16. 59	4, 4	4	26	495	Hl.	
May 5	8 37 54	343. 88	8 39 3	14. 45	4, 5	3	26	367	Hl.	Ft.

OBSERVATIONS OF DIAMETERS OF PLANETS AND WIDTHS OF SATURN'S RINGS

1757—29——10

Throughout Part I of this volume the astronomical dates
are used as employed before 1925

DIAMETERS

DIAMETER OF MARS

Date	Equatorial				Polar				No. of Meas-ures	See-ing	Inst.	Power and Illum.	Obsr.	Remarks
	W. M. T.	Meas-ured	Cor-rected	Unit Distance	W. M. T.	Meas-ured	Cor-rected	Unit Distance						
1909	h m	"	"	"	h m	"	"	"			in.			
Aug. 26	13 7	22. 89	23. 73	10. 054	12 50	23. 29	23. 16	9. 813	8, 8	---	26	360r.	Hl.	
27	14 16	22. 87	23. 65	9. 952	14 0	23. 37	23. 26	9. 788	8, 8	3	26	360r.	Hl.	
Sept. 1	13 45	24. 29	24. 84	10. 147	12 37	24. 64	24. 55	10. 029	16, 16	3	26	367p. Blk.	Hl.	Clds.
1	14 42	24. 61	25. 17	10. 279	-- --	-----	-----	------	8, 0	3	26	360r.	Hl.	Clouded.
2	12 44	24. 49	24. 99	10. 156	12 15	24. 16	23. 98	9. 745	8, 8	3–4	26	360r, Blk.	Hl.	Clds. Brt. moonlight.
5	14 6	25. 44	25. 80	10. 335	13 4	25. 19	25. 03	10. 027	16, 16	3	26	360r, Blk.	Hl.	
7	11 45	24. 81	25. 07	9. 968	11 10	24. 40	24. 24	9. 638	8, 8	2	26	360r, Blk.	Hl.	
8	13 26	24. 66	24. 87	9. 849	13 4	24. 34	24. 19	9. 579	8, 8	2	26		Hl.	
17	11 59	25. 43	25. 36	9. 878	11 41	24. 74	24. 56	9. 566	8, 8	3	26	360r, Blk.	Hl.	
30	13 32	25. 22	25. 18	10. 100	13 51	25. 43	25. 24	10. 124	8, 4	4	26	360r, Blk.	Hl.	
Oct. 1	9 52	25. 05	25. 02	10. 078	9 32	24. 74	24. 59	9. 905	8, 8	4	26	360r, Blk	Hl.	
5	12 25	23. 80	23. 88	9. 846	11 55	23. 34	23. 13	9. 536	8, 8	3	26	360r, Blk.	Hl.	
6	10 54	23. 88	23. 99	9. 951	10 21	23. 38	23. 16	9. 607	8, 8	2	26	360r, Blk.	Hl.	
7	10 6	23. 61	23. 75	9. 915	9 42	23. 13	22. 91	9. 563	8, 8	2–3	26	360r, Blk.	Hl.	
8	9 26	23. 13	23. 30	9. 796	9 6	22. 81	22. 61	9. 503	8, 8	2	26	360r, Blk.	Hl.	

DIAMETER OF JUPITER

Date	Equatorial W. M. T.	Meas-ured	Cor-rected	Unit Distance	Polar W. M. T.	Meas-ured	Cor-rected	Unit Distance	No. of Meas-ures	See-ing	Inst.	Power and Illum.	Obsr.	Remarks
1909														
Mar. 17	12 6	44. 93	44. 86	200. 28	11 58	41. 91	41. 79	186. 58	8, 8	---	26	525	Fn.	Unsteady.
17	12 50	45. 41	45. 34	202. 43	13 21	42. 45	42. 34	189. 04	8, 8	3	26	525, Brt.	Hl.	
20	12 55	44. 98	44. 92	201. 34	12 31	42. 43	42. 32	189. 68	8, 8	4	26	525, Brt.	Hl.	
28	9 40	44. 32	44. 31	201. 12	9 58	41. 39	41. 27	187. 32	8, 8	3	26	771, Brt.	Hl.	
30	9 50	44. 33	44. 33	201. 97	9 39	42. 14	42. 02	191. 44	8, 8	3–4	26	525, Red.	Ep.	
31	10 8	44. 34	44. 35	202. 45	9 51	41. 68	41. 56	189. 70	8, 8	3–4	26	771, Brt.	Hl.	
Apr. 11	12 33	43. 05	43. 13	201. 81	12 57	40. 54	40. 44	189. 23	8, 8	3	26	771, Brt.	Hl.	
15	9 45	42. 57	42. 67	201. 62	9 36	39. 68	39. 56	186. 92	8, 8	3	26	525, Brt.	Fn.	
15	9 55	42. 56	42. 66	201. 58	10 7	39. 87	39. 75	187. 83	8, 8	2	26	525, Brt.	Hl.	
16	8 45	41. 86	41. 97	198. 80	8 38	39. 81	39. 69	188. 00	8, 8	3	26	525, Brt.	Ep.	
16	11 2	42. 44	42. 55	201. 59	10 52	40. 11	40. 00	189. 51	8, 8	4	26	525	Fn.	
22	8 48	41. 29	41. 43	199. 44	8 36	39. 15	39. 03	187. 88	8, 8	3	26	525, Brt.	Ep.	
22	9 26	42. 08	42. 22	203. 26	9 16	39. 54	39. 42	189. 78	8, 8	3	26	525, Brt.	Fn.	
23	8 23	42. 08	42. 23	203. 85	8 16	39. 62	39. 50	190. 67	8, 8	4	26	525, Brt.	Fn.	
23	8 30	41. 42	41. 56	200. 62	8 37	39. 38	39. 26	189. 52	8, 8	4	26	525, Brt.	Ep.	
24	8 47	41. 49	41. 64	201. 58	8 40	39. 08	38. 96	188. 61	8, 8	3	26	525, Brt.	Fn.	
24	8 55	41. 13	41. 28	199. 84	9 1	38. 71	38. 59	186. 82	8, 8	---	26	525	Ep.	
26	9 6	40. 99	41. 14	200. 31	9 19	38. 80	38. 68	188. 33	8, 8	4	26	771, Brt.	Hl.	
26	9 40	41. 48	41. 64	202. 74	9 33	39. 38	39. 26	191. 15	8, 8	4	26	388, Brt.	Ep.	
1910														
Apr. 22	10 16	44. 07	44. 02	199. 28	9 53	41. 34	41. 22	186. 61	4, 16	2	26	388, Brt.	Hl.	Clouded.
26	11 51	43. 94	43. 91	200. 04	11 13	41. 22	41. 10	187. 24	8, 8	3	26	388, Brt.	Hl.	
1912														
Apr. 10	16 1	43. 11	43. 24	202. 97	15 14	41. 08	40. 99	192. 41	8, 8	3	26	367p, Brt.	Hl.	
23	15 39	44. 70	44. 76	203. 09	15 20	42. 05	41. 96	190. 38	8, 8	3	26	367p, Brt.	Hl.	

DIAMETERS

DIAMETER OF JUPITER—Continued

Date	Equatorial				Polar				No. of Meas-ures	See-ing	Inst.	Power and Illum.	Obsr.	Remarks
	W. M. T.	Meas-ured	Cor-rected	Unit Distance	W. M. T.	Meas-ured	Cor-rected	Unit Distance						
1912	h m	"	"	"	h m	"	"	"			in.			
May 1	13 52	45. 69	45. 69	203. 73	14 27	43. 21	43. 12	192. 27	8, 8	3–4	26	367p, Brt.	Hl.	
3	13 37	45. 80	45. 79	203. 39	14 13	43. 37	43. 28	192. 24	8, 8	3–4	26	367p, Brt.	Hl.	
4	13 55	45. 17	45. 15	200. 17	13 25	42. 57	42. 48	188. 34	8, 8	3	26	367p, Brt.	Hl.	
4	14 27	45. 16	45. 14	200. 11	15 1	42. 46	42. 38	187. 88	8, 8	3–4	26	367p, Brt.	Ws.	
8	14 32	46. 96	46. 92	206. 57	15 14	43. 67	43. 59	191. 91	8, 8	3–4	26	367p, Brt.	Hl.	
10	13 42	46. 35	46. 30	203. 22	14 7	43. 09	43. 00	188. 74	8, 8	3	26	367p, Brt.	Hl.	
18	12 38	46. 15	46. 06	200. 16	12 4	43. 43	43. 34	188. 34	8, 8	3	26	367p, Brt.	Hl.	
21	14 9	46. 46	46. 36	200. 91	14 44	43. 69	43. 62	189. 03	8, 8	3	26	367p, Brt.	Hl.	
25	12 37	46. 69	46. 58	201. 34	12 0	43. 71	43. 62	188. 54	8, 8	3–4	26	367p, Brt.	Hl.	
27	13 14	46. 55	46. 44	200. 55	12 37	43. 97	43. 88	189. 49	8, 8	3	26	367p, Brt.	Hl.	
28	11 21	46. 22	46. 11	199. 05	10 52	43. 75	43. 66	188. 48	8, 8	3–4	26	367p, Brt.	Hl.	
31	12 42	46. 43	46. 31	199. 78	12 8	43. 41	43. 32	186. 88	8, 8	2–3	26	367p, Brt.	Hl.	
31	13 32	47. 38	47. 26	203. 87	14 14	44. 40	44. 34	191. 28	8, 8	3–4	26	367p, Brt.	Bn.	
June 1	11 40	46. 33	46. 21	199. 33	12 3	43. 61	43. 52	187. 73	8, 8	2–3	26	367p, Brt.	Bn.	
1	13 4	46. 34	46. 22	199. 37	12. 37	43. 54	43. 45	187. 43	8, 8	2	26	367p, Brt.	Hl.	

DIAMETER OF SATURN

Date	W. M. T.	Meas-ured	Cor-rected	Unit Distance	W. M. T.	Meas-ured	Cor-rected	Unit Distance	No. of Meas-ures	See-ing	Inst.	Power and Illum.	Obsr.	Remarks
1909 Oct. 30	9 46	19. 69	19. 56	164. 26	9 55	18. 24	18. 11	152. 08	8, 8	2	26	388, Brt.	Ep.	

DIAMETER OF RING A OF SATURN

Date	Outer Diameter				Inner Diameter				No. of Meas-ures	See-ing	Inst.	Power and Illum.	Obsr.	Remarks
	W. M. T.	Meas-ured	Cor-rected	Unit Distance	W. M. T.	Meas-ured	Cor-rected	Unit Distance						
1909	h m	"	"	"	h m	"	"	"			in.			
Oct. 30	9 10	45. 47	45. 36	380. 92	9 23	39. 55	39. 44	331. 21	8, 8	2	26	388, Brt.	Ep.	

WIDTH OF RINGS OF SATURN

Date		East Side			West Side			No. of Meas-ures	See-ing	Inst.	Power and Illum.	Obsr.
		W. M. T.	Meas-ured	Unit Dis-tance	W. M. T.	Meas-ured	Unit Dis-tance					
1913		h m	"	"	h m	"	"			in.		
Nov. 21	Width of A	14 35	3. 14	25. 38	14 44	2. 92	23. 61	4, 4	2–3	26	367b, Blk.	Bn.
Dec. 20	Width of A	10 28	2. 84	22. 94	10 20	2. 99	24. 16	4, 4	2–3	26	367b, Blk.	Bn.
Nov. 21	Outer edge of A to Encke division	11 15	1. 59	12. 85	12 10	1. 50	12. 13	4, 4	2–3	26	388, Blk.	Bn.
Dec. 20	Outer edge of A to Encke division	9 49	1. 61	13. 01	-- --	----	-----	4, 0	2	26	367b, Blk.	Bn.
Nov. 21	Encke division to inner edge of A	11 34	1. 47	11. 88	12 1	1. 27	10. 27	4, 4	2–3	26	388, Blk.	Bn.
Nov. 21	Width of B	15 12	4. 85	39. 21	14. 58	4. 77	38. 56	4, 4	3	26	367b, Blk.	Bn.
Dec. 20	Width of B	10 40	4. 91	39. 67	10 50	4. 53	36. 60	4, 4	3	26	367b, Blk.	Bn.

DIAMETERS

DIAMETER OF URANUS

Date		W. M. T.	Measured	Corrected	Unit Distance	No. of Measures	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1911		h m	"	"	"			in.			
Aug. 16	In plane of satellites' orbits	9 0	4. 14	4. 02	75. 7	16	3	26	495p, Brt.	Ep.	
17	In plane of satellites' orbits	9 27	3. 58	3. 45	64. 9	16	3	26	495p, Brt.	Ep.	
22	In plane of satellites' orbits	10 23	3. 68	3. 55	67. 0	16	3	26	495p, Brt.	Ep.	
Sept. 1	In plane of satellites' orbits	8 34	3. 80	3. 67	69. 7	16	2	26	495p, Brt.	Ep.	Moonlight.
11	In plane of satellites' orbits	10 9	3. 52	3. 39	64. 8	16	2	26	495p, Brt.	Ep.	
1912											
July 2	In right ascension	12 55	4. 37	4. 24	79. 8	8	2	26	367p, Brt.	Hl.	Moonlight. Haze.
3	In right ascension	13 47	4. 11	3. 98	74. 9	8	2	26	367p, Brt.	Bn.	Moonlight.
July 2	In declination	13 16	4. 49	4. 36	82. 1	8	2	26	367p, Brt.	Hl.	Moonlight. Haze.
3	In declination	14 10	4. 09	3. 96	74. 5	8	2	26	367, Brt.	Bn.	Moonlight.

DIAMETER OF NEPTUNE

Date	In Right Ascension				In Declination				No. of Measures	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
	W. M. T.	Measured	Corrected	Unit Distance	W. M. T.	Measured	Corrected	Unit Distance						
1909	h m	"	"	"	h m	"	"	"			in.			
Mar. 22	9 0	3. 52	3. 39	100. 8	8 50	3. 36	3. 23	96. 0	8, 8	3	26	771, Brt.	Ep.	
22	9 8	3. 74	3. 61	107. 3	9 16	3. 57	3. 44	102. 2	8, 8	3	26	525, Red.	Ep.	
22	9 48	3. 59	3. 46	102. 8	9 30	3. 91	3. 78	112. 3	8, 8	3	26	525, Red.	Hl.	
23	8 59	2. 96	2. 83	84. 2	8 50	3. 36	3. 23	96. 1	8, 8	---	26	525, Red.	Fn.	
28	9 10	3. 24	3. 11	92. 7	8 50	3. 08	2. 95	88. 0	8, 8	3	26	771, Brt.	Hl.	Moon near.
30	9 4	3. 62	3. 49	104. 2	9 15	2. 84	2. 71	80. 9	8, 8	3	26	771, Red.	Ep.	Blue wires used in
Apr. 15	8 16	2. 29	2. 16	65. 1	8 8	2. 62	2. 49	75. 0	8, 8	4	26	525, Red.	Fn.	declinations.
15	8 30	3. 20	3. 07	92. 5	8 39	3. 20	3. 07	92. 5	8, 8	3–4	26	525, Brt.	Hl.	
16	7 34	3. 44	3. 31	99. 8	7 27	3. 50	3. 37	101. 6	8, 10	3	26	525, Brt.	Fn.	Twilight at begin-
16	7 44	3. 10	2. 97	89. 5	7 52	3. 46	3. 33	100. 4	8, 8	3	26	525, Brt.	Ep.	ning.
16	8 17	3. 18	3. 05	91. 9	8 3	3. 40	3. 27	98. 6	8, 8	3	26	525, Brt.	Hl.	
22	7 48	3. 04	2. 91	88. 1	7 56	2. 98	2. 85	86. 2	8, 8	3	26	525, Brt.	Ep.	
22	8 10	3. 36	3. 23	97. 7	8 4	3. 36	3. 23	97. 7	8, 8	3	26	525, Brt.	Fn.	
24	7 43	2. 78	2. 65	80. 2	7 49	2. 79	2. 66	80. 5	8, 8	3	26	525, Brt.	Ep.	
24	8 3	3. 02	2. 89	87. 5	7 56	3. 33	3. 20	96. 9	8, 8	3	26	525, Brt.	Fn.	
26	8 33	2. 95	2. 82	85. 4	8 11	3. 07	2. 94	89. 1	8, 8	3–4	26	525, Brt.	Hl.	
1912														
Apr. 3	7 32	3. 54	3. 41	101. 7	----	----	----	----	8, 0	3–4	26	367p, Brt.	Hl.	
10	7 38	2. 93	2. 80	83. 9	8 7	2. 79	2. 66	79. 7	8, 8	3–4	26	495p, Brt.	Hl.	
11	7 23	3. 39	3. 26	97. 7	7 43	3. 34	3. 21	96. 2	8, 8	3	26	367p, Brt.	Hl.	

OBSERVATIONS OF ASTEROIDS

Throughout Part I of this volume the astronomical dates are used as employed before 1925

Date	W. M. T.	Apparent Place of Asteroid		Asteroid—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
(1) CERES										
1915	h m s	h m s	° ′ ″	m s	′ ″				s	″
Oct. 28	12 31 1	3 44 15. 17	+11 4 54. 8	+2 1. 23	+ 9 11. 8	t24, 5	8. 980*n*	0. 613	+4. 63	+22. 6
1917										
Mar. 19	14 18 2	11 19 34. 99	+22 46 50. 8	+5 54. 01	+ 9 5. 3	t25, 5	9. 520	0. 490	+3. 17	−16. 3
24	9 20 56	11 15 45. 00	+22 57 25. 2	+2 4. 04	+19 39. 1	t25, 5	9. 349*n*	0. 427	+3. 15	−15. 7
25	8 56 49	11 15 0. 41	+22 58 50. 5	+1 19. 45	+21 4. 3	t25, 5	9. 415*n*	0. 444	+3. 15	−15. 6
1923										
June 9	15 13 52	21 18 21. 87	−24 32 7. 2	+0 40. 42	+ 0. 51. 9	d10, 8	9. 067*n*	0. 891	+1. 71	+17. 2
20	13 54 19	21 17 42. 07	−25 28 52. 6	−0 15. 79	+ 0 20. 2	d10, 8	9. 286*n*	0. 886	+2. 05	+18. 6
30	13 1 5	21 14 31. 33	−26 30 24. 7	−0 29. 18	− 8 9. 8	d10, 8	9. 336*n*	0. 886	+2. 37	+19. 5
July 7	11 56 13	21 10 53. 98	−27 16 56. 1	+0 3. 86	− 1 52. 9	d12, 10	9. 454*n*	0. 875	+2. 55	+19. 8
Aug. 7	11 2 25	20 45 27. 36	−30 26 2. 5	+0 11. 92	− 4 15. 9	d10, 8	8. 969*n*	0. 912	+3. 18	+18. 3
13	10 48 14	20 40 7. 71	−30 50 14. 7	−0 36. 57	− 5 4. 5	d10, 8	8. 772*n*	0. 915	+3. 24	+17. 6
Sept. 1	8 43 49	20 26 37. 21	−31 28 14. 4	+0 30. 12	− 5 5. 5	d10, 9	9. 156*n*	0. 911	+3. 19	+15. 0
11	9 25 40	20 22 35. 08	−31 25 56. 6	−0 38. 80	+ 3 51. 4	d10, 8	8. 737	0. 916	+3. 10	+13. 8
17	9 17 7	20 21 25. 08	−31 18 18. 3	−0 26. 56	+ 2 43. 7	d10, 8	8. 964	0. 915	+3. 02	+13. 3
(2) PALLAS										
1914										
June 30	11 51 51	19 46 19. 67	+20 28 58. 0	−2 30. 21	− 2 6. 0	t25, 5	9. 227*n*	0. 462	+2. 91	− 2. 8
1923										
Apr. 9	14 27 42	19 2 7. 48	+14 25 33. 5	−0 3. 24	− 2 57. 3	d10, 8	9. 565*n*	0. 629	+0. 70	− 2. 7
10	15 24 17	19 2 37. 94	+14 36 1. 8	−0 5. 23	+ 1 25. 7	d10, 8	9. 444*n*	0. 594	+0. 73	− 2. 7
16	14 53 24	19 5 10. 25	+15 36 27. 1	−0 14. 60	+ 1 31. 4	d10, 9	9. 470*n*	0. 586	+0. 86	− 2. 5
(3) JUNO										
1915										
Mar. 10	12 43 30	11 5 15. 64	+ 4 30 39. 5	+0 46. 90	− 7 53. 0	t45, 15	8. 992	0. 695	+2. 53	−13. 7
17	10 38 28	10 59 53. 32	+ 5 37 12. 5	+2 32. 51	+ 3 53. 2	t30, 6	8. 932*n*	0. 682	+2. 54	−13. 3
1917										
July 23	14 33 41	20 25 12. 98	− 4 9 42. 5	+3 28. 22	− 1 46. 1	t30, 6	9. 404	0. 771	+4. 22	+13. 8
29	11 37 36	20 20 7. 44	− 4 42 16. 8	−0 38. 77	+ 2 55. 5	t30, 6	8. 432*n*	0. 781	+4. 28	+14. 5
Aug. 13	12 25 12	20 7 28. 05	− 6 25 38. 6	+1 19. 20	− 1 22. 6	t25, 5	9. 312	0. 789	+4. 40	+14. 7
1923										
Apr. 26	8 3 46	5 55 42. 53	+14 6 45. 0	−0 8. 16	− 1 13. 9	d10, 8	9. 634	0. 668	−0. 07	−11. 5
(4) VESTA										
1912										
Mar. 10	11 54 2	9 47 39. 97	+22 43 37. 1	−5 56. 95	− 0 21. 6	t25, 5	9. 231	0. 412	+1. 71	− 1. 3
Apr. 3	9 5 20	9 37 52. 95	+23 11 35. 4	−2 11. 01	− 1 11. 7	t15, 5	8. 529	0. 373	+1. 48	+ 1. 7
6	9 57 20	9 37 54. 09	+23 6 48. 0	−2 9. 85	− 5 59. 2	t14, 5	9. 228	0. 402	+1. 46	+ 1. 8
1915										
Feb. 8	10 54 3	4 27 14. 49	+19 33 32. 2	+3 35. 10	+ 0 8. 8	t30, 6	9. 598	0. 587	+1. 48	+ 9. 9
10	9 10 42	4 28 2. 92	+19 40 54. 7	+2 43. 07	+ 1 21. 4	t25, 5	9. 395	0. 504	+1. 48	+ 9. 9
27	9 39 25	4 39 6. 26	+20 48 13. 0	+2 45. 88	+ 3 18. 9	t30, 6	9. 585	0. 561	+1. 29	+ 9. 8
1916										
Apr. 15	12 37 16	13 35 10. 74	+ 3 49 19. 3	−3 42. 53	− 8 6. 6	t25, 5	8. 881	0. 702	+2. 96	−19. 6
29	13 3 12	13 22 42. 60	+ 4 32 55. 8	+6 8. 32	− 0 53. 8	t25, 5	9. 397	0. 701	+3. 00	−18. 4
May 31	9 26 55	13 9 39. 51	+ 3 17 13. 2	−1 39. 93	−12 9. 8	t25, 5	9. 031	0. 708	+2. 91	−16. 2

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
(1) CERES							
h m s	° ′ ″			in.			
3 42 9. 31	+10 55 20. 4	AG Leipzig I 1094	2	12	115	B.	
11 13 37. 81	+22 38 1. 8	AG Berlin B 4232	--	12	---	C.	Practice obsn.
11 13 37. 81	+22 38 1. 8	AG Berlin B 4232	--	12	---	C.	Practice obsn.
11 13 37. 81	+22 38 1. 8	AG Berlin B 4232	--	12	---	C.	Practice obsn.
21 17 39. 74	−24 33 16. 3	Cordoba A 14724	4	26	183	B.	
21 17 55. 81	−25 29 31. 4	Cordoba A 14727	4	26	183	B.	
21 14 58. 14	−26 22 34. 4	Cordoba A 14701	3	26	183	B.	
21 10 47. 57	−27 15 23. 0	Cordoba B 13977	4	26	183	B.	
20 45 12. 26	−30 22 4. 9	Cordoba B 13711	3	26	183	B.	
20 40 41. 04	−30 45 27. 8	Cordoba B 13659	4	26	183	B.	Clouds. Brt. field.
20 26 3. 90	−31 23 23. 9	Ast Per −32° 2024, 335	3	26	183	B.	
20 23 10. 78	−31 30 1. 8	Ast Per −32° 2024, 311	2	26	183	B.	
20 21 48. 62	−31 21 15. 3	Ast Per −32° 2024, 343	2	26	183	B.	
(2) PALLAS							
19 48 46. 97	+20 31 6. 8	AG Berlin B 7332	2	12	115	B.	Practice obsn.
19 2 10. 02	+14 28 33. 5	Ast Bor +14° 1904, 23; +15° 1900, 373	3	26	183	B.	Brt. field.
19 2 42. 44	+14 34 38. 8	Ast Bor +14° 1904, 39; +15° 1900, 388	3	26	183	B.	Clouds. Brt. field.
19 5 23. 99	+15 34 58. 2	Ast Bor +15° 1900, 218; +15° 1908, 12; +16° 1904, 312.	4	26	183	B.	Brt. field.
(3) JUNO							
11 4 26. 21	+ 4 38 46. 2	AG Albany 4206	3–4	12	235	Wr.	Practice obsn.
10 57 18. 27	+ 5 33 32. 6	AG Leipzig II 5662	2	12	115	Wr.	Practice obsn.
20 21 40. 54	− 4 8 10. 2	AG Straszburg 7055	--	12	---	C.	Practice obsn.
20 20 41. 93	− 4 45 26. 8	AG Straszburg 7050	--	12	---	C.	Practice obsn.
20 6 4. 45	− 6 24 30. 7	AG Wien-Ottakring 7101	--	12	---	C.	Practice obsn.
5 55 50. 76	+14 8 10. 4	Ast Bor +14° 0552, 353; +15° 0556, 372	3	26	183	B.	
(4) VESTA							
9 53 35. 21	+22 44 0. 0	AG Berlin B 3889	3	12	160	Ws.	Practice obsn.
9 40 2. 48	+23 12 45. 4	AG Berlin B 3834	4	12	235	Ws.	Practice obsn.
9 40 2. 48	+23 12 45. 4	AG Berlin B 3834	4	12	235	Ws.	Practice obsn.
4 23 37. 91	+19 33 13. 5	AG Berlin A 1187	3	12	115	Wr.	Clds.. Haze. Practice obsn.
4 25 18. 37	+19 39 23. 4	AG Berlin A 1198	2	12	115	Wr.	Practice obsn.
4 36 19. 09	+20 44 44. 3	AG Berlin B 1492	4	12	115	Wr.	Practice obsn.
13 38 50. 31	+ 3 57 45. 5	AG Albany 4781	3	12	115	B.	Perhaps sidereal time should be decreased 1^m.
13 16 31. 28	+ 4 34 8. 0	AG Albany 4699	3	12	115	B.	Poor obsn.
13 11 16. 53	+ 3 29 39. 2	AG Albany 4672	3	12	115	B.	

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log ρρ α	Log ρρ δ	Star to App. Place α	Star to App. Place δ
(4) VESTA—Continued										
1917	h m s	h m s	° ′ ″	m s	′ ″				s	″
Aug. 25	15 36 45	0 54 32. 33	− 5 45 7. 8	−2 41. 86	+ 0 24. 5	t50, 10	9. 063	0. 788	+3. 99	+28. 4
Sept. 17	10 5 28	0 40 15. 00	− 8 29 23. 2	+2 31. 91	+ 2 46. 4	t25, 5	9. 492n	0. 792	+4. 44	+29. 8
Oct. 6	13 4 16	0 22 49. 85	−10 26 16. 0	−0 8. 76	− 6 51. 4	d10, 10	9. 304	0. 815	+4. 62	+29. 2
15	11 32 33	0 15 20. 06	−10 57 49. 5	−1 52. 89	+10 22. 9	t25, 5	9. 038	0. 824	+4. 61	+28. 4
(5) ASTRAEA										
1917										
Mar. 24	11 7 49	13 2 33. 39	+ 1 5 38. 9	−0 35. 11	+ 4 9. 4	t30, 6	9. 312n	0. 731	+2. 92	−19. 7
25	9 50 12	13 1 47. 33	+ 1 12 58. 3	−1 19. 18	+11 28. 8	t24, 5	9. 514n	0. 732	+2. 93	−19. 7
(7) IRIS										
1917										
July 23	11 41 16	19 59 33. 67	−14 20 48. 1	+3 2. 11	−10 49. 5	t30, 6	8. 425n	0. 846	+4. 47	+11. 8
29	10 50 2	19 53 16. 45	−14 27 10. 3	−0 26. 03	+ 5 11. 2	t30, 6	8. 848n	0. 846	+4. 52	+11. 9
Aug. 13	11 43 8	19 38 59. 36	−14 47 50. 9	−1 23. 16	− 0 7. 2	t25, 5	9. 268	0. 840	+4. 57	+11. 1
(8) FLORA										
1917										
Mar. 9	10 4 28	9 32 6. 44	+21 17 15. 2	−4 4. 00	− 6 45. 1	t25, 4	8. 603n	0. 422	+3. 07	−11. 2
(11) PARTHENOPE										
1916										
Sept. 17	12 49 27	22 47 10. 33	−13 30 41. 5	−8 4. 57	+ 0 9. 6	t35, 7	9. 335	0. 830	+4. 56	+25. 4
19	11 56 2	22 45 46. 35	−13 41 8. 3	−2 41. 47	− 8 48. 6	t29, 6	9. 121	0. 838	+4. 57	+25. 0
20	11 0 35	22 45 6. 87	−13 45 56. 9	−0 1. 45	− 2 38. 5	d10, 10	8. 467	0. 843	+4. 58	+24. 7
20	11 37 50	22 45 5. 85	−13 46 5. 5	−0 2. 47	− 2 47. 1	5, 5	9. 022	0. 841	+4. 58	+24. 7
(13) EGERIA										
1910										
Apr. 2	10 20 50	12 33 48. 73	+14 43 14. 9	−0 51. 05	− 5 58. 4	t25, 5	9. 260n	0. 569	+1. 22	− 7. 0
9	13 48 57	12 26 20. 72	+14 29 31. 6	−2 21. 34	− 0 8. 7	t15, 3	9. 466	0. 600	+1. 23	− 6. 1
14	13 0 55	12 21 34. 32	+14 12 59. 5	−2 59. 67	−13 47. 4	t25, 5	9. 402	0. 592	+1. 24	− 5. 6
1916										
Oct. 6	12 0 8	1 19 41. 42	− 5 21 46. 5	+1 15. 64	+ 0 16. 9	t50, 10	8. 544n	0. 786	+4. 51	+29. 6
10	9 54 46	1 15 33. 47	− 5 24 14. 5	+3 35. 45	− 1 6. 0	t30, 6	9. 372n	0. 780	+4. 53	+29. 4
(15) EUNOMIA										
1916										
Sept. 9	13 28 46	22 42 23. 54	+10 7 40. 8	−3 0. 46	+ 5 8. 5	t50, 10	9. 373	0. 641	+4. 24	+25. 7
11	12 46 34	22 40 32. 41	+10 4 30. 8	−4 13. 75	− 1 15. 0	t57, 11	9. 248	0. 634	+4. 24	+25. 9
17	9 3 26	22 35 16. 17	+ 9 50 58. 8	+3 44. 00	− 3 0. 6	t29, 6	9. 313n	0. 640	+4. 21	+26. 1
19	9 37 2	22 33 33. 07	+ 9 45 1. 2	+2 0. 89	− 8 58. 5	t30, 6	9. 092n	0. 633	+4. 22	+26. 4
27	10 59 9	22 27 32. 65	+ 9 16 36. 7	−2 27. 25	+16 29. 4	t34, 7	9. 064	0. 639	+4. 18	+26. 8
Oct. 6	9 2 37	22 22 52. 25	+ 8 40 33. 6	−2 8. 24	− 1 53. 4	t29, 6	8. 575n	0. 644	+4. 14	+27. 3
1918										
Feb. 28	11 40 34	8 58 58. 26	+ 7 50 24. 5	−4 19. 81	+ 1 38. 4	t25, 5	9. 168	0. 659	+2. 85	−13. 9

(4) VESTA—Continued

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
0 57 10. 20	− 5 46 0. 7	AG Straszburg 226	--	12	---	C.	Practice obsn.
0 37 38. 65	− 8 32 39. 4	AG Wien-Ottakring 139	--	12	---	C.	Practice obsn.
0 22 53. 99	−10 19 53. 8	AG Harvard 78	--	12	--	C.	Practice obsn.
0 17 8. 34	−11 8 40. 8	AG Harvard 56	--	12	--	C.	Practice obsn.
(5) ASTRAEA							
13 3 5. 58	+ 1 1 49. 2	AG Albany 4644	--	12	---	C.	Practice obsn.
13 3 5. 58	+ 1 1 49. 2	AG Albany 4644	--	12	---	C.	Practice obsn.
(7) IRIS							
19 56 27. 09	−14 10 10. 4	AG Washington 7516	--	12	---	C.	Practice obsn.
19 53 37. 96	−14 32 33. 4	AG Washington 7505	--	12	---	C.	Practice obsn.
19 40 17. 95	−14 47 54. 8	AG Washington 7424	--	12	---	C.	Practice obsn.
(8) FLORA							
9 36 7. 37	+21 24 11. 5	AG Berlin B 3818	--	12	---	C.	Practice obsn.
(11) PARTHENOPE							
22 55 10. 34	−13 31 16. 5	PGC Boss 5923	--	12	---	C.	Practice obsn.
22 48 23. 25	−13 32 44. 7	AG Harvard 8044	--	12	---	C.	Practice obsn.
22 45 3. 74	−13 43 43. 1	AG Washington 8474	--	12	---	C.	Practice obsn.
22 45 3. 74	−13 43 43. 1	AG Washington 8474	--	12	---	C.	Position angle and distance. Poor obsn.
(13) EGERIA							
12 34 38. 56	+14 49 20. 3	AG Berlin A 4720; AG Leipzig I 4640	--	12	115	Bn.	Practice obsn.
12 28 40. 83	+14 29 46. 4	AG Leipzig I 4608	--	12	---	Bn.	Practice obsn. Unsatisfactory.
12 24 32. 75	+14 26 52. 5	AG Leipzig I 4593	--	12	---	Bn.	Practice obsn.
1 18 21. 27	− 5 22 33. 0	AG Straszburg 312	5	12	---	C.	Practice obsn.
1 11 53. 49	− 5 23 37. 9	AG Straszburg 285	--	12	---	C.	Practice obsn.
(15) EUNOMIA							
22 45 19. 76	+10 2 6. 6	AG Leipzig II 11415	--	12	---	C.	Practice obsn.
22 44 41. 92	+10 5 19. 9	AG Leipzig II 11409	--	12	---	C.	Practice obsn.
22 31 27. 96	+ 9 53 33. 3	AG Leipzig II 11316	--	12	---	C.	Practice obsn.
22 31 27. 96	+ 9 53 33. 3	AG Leipzig II 11316	--	12	---	C.	Practice obsn.
22 29 55. 72	+ 8 59 40. 5	AG Leipzig II 11312	--	12	---	C.	Practice obsn.
22 24 56. 35	+ 8 41 59. 7	AG Leipzig II 11279	5	12	---	C.	Practice obsn.
9 3 15. 22	+ 7 49 0. 0	AG Leipzig II 4965	3½	12	---	C.	Practice obsn.

Date	W. M. T.	Apparent Place of Asteroid		Asteroid—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
					(16) PSYCHE					
	h m s	h m s	° ′ ″	m s	′ ″				s	″
1909 July 28	11 52 34	20 22 19.84	−17 13 13.4	+2 56.25	+ 4 58.4	t30, 6	8.011n	0.862	+2.32	+ 5.8
					(19) FORTUNA					
1908 Apr. 6	11 25 30	13 11 59.63	− 8 11 42.3	−0 56.67	+ 3 12.3	t25, 5	8.967n	0.806	+1.01	− 5.8
6	12 10 30	13 11 57.92	− 8 11 31.8	−3 54.43	+ 4 4.3	t20, 4	7.359n	0.807	+1.01	− 5.7
6	12 10 30	13 11 57.88	− 8 11 32.8	−5 32.86	+ 1 39.4	t20, 4	7.359n	0.807	+1.01	− 5.7
20	10 35 7	12 59 42.68	− 6 48 55.6	−1 30.96	− 0 37.9	t25, 5	8.769n	0.788	+1.06	− 6.2
20	10 35 7	12 59 42.68	− 6 48 57.9	−2 20.82	− 0 50.8	t25, 5	8.769n	0.788	+1.06	− 6.2
1909 July 24	11 7 49	19 51 44.96	−18 14 19.6	+0 16.67	− 4 36.0	t25, 5	8.865n	0.866	+2.30	+ 4.1
Aug. 7	9 29 52	19 38 39.89	−18 51 9.7	−0 52.53	− 6 35.2	t25, 5	9.130n	0.865	+2.37	+ 3.5
1917 Sept. 19	10 1 35	23 45 12.22	+ 0 13 39.1	+2 48.00	+ 8 57.6	t24, 5	9.324n	0.738	+4.49	+29.0
Oct. 11	10 42 15	23 28 55.66	− 1 57 41.5	−1 1.84	−15 48.6	t24, 5	8.829	0.758	+4.53	+29.2
15	10 59 45	23 26 59.03	− 2 15 37.1	+1 43.23	− 1 13.1	t25, 5	9.134	0.760	+4.48	+28.8
					(22) KALLIOPE					
1909 Apr. 16	10 53 11	13 59 28.17	+ 1 36 12.6	−2 12.19	+11 47.7	t25, 5	9.232n	0.726	+1.09	− 7.4
23	10 5 52	13 53 28.45	+ 1 48 14.8	−3 4.24	+ 2 21.4	t25, 5	9.292n	0.724	+1.14	− 6.9
26	11 7 50	13 50 52.97	+ 1 51 44.0	+2 27.20	− 5 59.3	t25, 5	8.697n	0.722	+1.17	− 6.7
1916 Oct. 10	12 19 5	1 18 17.85	−10 8 15.2	+6 38.42	+ 5 8.0	t30, 6	8.577	0.821	+4.53	+29.2
27	13 38 26	1 3 25.11	−10 8 3.9	−0 11.98	+ 5 34.9	t50, 10	9.517	0.797	+4.58	+27.7
					(28) BELLONA					
1908 Dec. 18	9 43 17	6 14 10.01	+10 40 13.9	+0 5.52	+ 0 52.6	t30, 6	9.479n	0.647	+3.44	− 0.5
19	8 47 48	6 13 17.35	+10 42 16.4	−1 1.31	− 3 5.3	t25, 5	9.458n	0.644	+3.46	− 0.6
20	8 39 13	6 12 22.55	+10 44 32.4	+1 55.64	+ 8 6.0	t25, 5	9.576n	0.668	+3.47	− 0.4
1910 Apr. 30	13 56 34	15 5 23.44	− 2 28 38.0	+2 0.74	− 0 42.6	t20, 4	9.217	0.761	+1.34	− 9.8
May 4	13 43 7	15 2 5.21	− 2 10 49.7	−0 49.89	+ 2 54.1	t25, 5	9.244	0.758	+1.38	− 9.8
					(29) AMPHITRITE					
1917 Oct. 6	12 8 15	1 50 52.80	+16 28 33.4	+1 58.65	−11 23.1	t25, 5	8.934n	0.526	+4.82	+26.5
Nov. 17	10 22 40	1 14 27.04	+14 32 31.6	−3 9.98	−12 29.9	t25, 5	9.048	0.562	+4.89	+30.3
					(33) POLYHYMNIA					
1917 Sept. 17	11 16 9	0 39 50.85	+ 3 47 54.8	+1 39.79	+ 4 40.0	t30, 6	9.277n	0.705	+4.45	+28.8
18	10 50 30	0 39 12.57	+ 3 45 34.0	+1 1.50	+ 2 19.1	t30, 6	9.356n	0.707	+4.46	+28.9
Oct. 6	10 4 40	0 26 14.30	+ 2 54 41.0	−0 5.58	+ 5 40.4	t30, 6	9.199n	0.713	+4.61	+30.0
15	12 13 26	0 20 22.01	+ 2 32 11.0	+0 54.62	+14 42.2	t24, 5	9.242	0.717	+4.60	+30.0

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
(16) PSYCHE							
h m s	° ′ ″			in.			
20 19 21. 27	−17 18 17. 6	AG Washington 7675	3	12	--	Fn.	
(19) FORTUNA							
13 12 55. 29	− 8 14 48. 8	AG Wien-Ottakring 4766	3	12	---	Fn.	
13 15 51. 34	− 8 15 30. 4	AG Wien-Ottakring 4778	1	12	---	Fn.	
13 17 29. 73	− 8 13 6. 5	AG Wien-Ottakring 4785	1	12	---	Fn.	
13 1 12. 58	− 6 48 11. 5	AG Wien-Ottakring 4715	3	12	---	Fn.	
13 2 2. 44	− 6 48 0. 9	AG Wien-Ottakring 4721	3	12	---	Fn.	
19 51 25. 99	−18 9 47. 7	AG Algiers 8544	4	12	115	Ep.	
19 39 30. 05	−18 44 38. 0	AG Algiers 8460	2	12	115	Ep.	
23 42 19. 73	+ 0 4 12. 5	AG Nicolajew 5891	--	12	---	C.	Practice obsn.
23 29 52. 97	− 1 42 22. 1	AG Nicolajew 5850	--	12	---	C.	Practice obsn.
23 25 11. 32	− 2 14 52. 8	AG Straszburg 8067	4	12	---	C.	Practice obsn.
(22) KALLIOPE							
14 1 39. 27	+ 1 24 32. 3	AG Albany 4873	2	12	115	Ep.	
13 56 31. 55	+ 1 46 0. 3	AG Albany 4838	2	12	115	Ep.	
13 48 24. 60	+ 1 57 50. 0	AG Albany 4810	3	12	115	Ep.	
1 11 34. 90	−10 13 52. 4	AG Harvard 253	--	12	---	C.	Practice obsn.
1 3 32. 51	−10 14 6. 5	AG Harvard 226	5	12	---	C.	Practice obsn.
(28) BELLONA							
6 14 1. 05	+10 39 21. 8	AG Leipzig I 2165	2	12	---	Ep.	
6 14 15. 20	+10 45 22. 3	AG Leipzig I 2171	2	12	---	Ep.	Sidereal time of obs. as recorded decreased by 1.ʰ
6 10 23. 44	+10 36 26. 8	AG Leipzig I 2126	2	12	---	Ep.	Used s. pr. component of star.
15 3 21. 36	− 2 27 45. 6	AG Straszburg 5299	--	12	---	Bn.	Practice obsn.
15 2 53. 70	− 2 13 34. 0	AG Nicolajew 3868	--	12	---	Bn.	Practice obsn.
(29) AMPHITRITE							
1 48 49. 33	+16 39 30. 0	AG Berlin A 539	--	12	---	C.	Practice obsn.
1 17 32. 13	+14 44 31. 2	AG Leipzig I 383	--	12	---	C.	Practice obsn.
(33) POLYHYMNIA							
0 38 6. 61	+ 3 42 46. 0	AG Albany 164	--	12	---	C.	Practice obsn.
0 38 6. 61	+ 3 42 46. 0	AG Albany 164	--	12	---	C.	Practice obsn.
0 26 15. 27	+ 2 48 30. 6	AG Albany 90	--	12	---	C.	Practice obsn.
0 19 22. 79	+ 2 16 58. 8	AG Albany 67	--	12	---	C.	Practice obsn.

(39) LAETITIA

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pp α	Log pp δ	Star to App. Place α	Star to App. Place δ
1908	h m s	h m s	° ′ ″	m s	′ ″				s	″
July 1	11 47 14	18 16 6. 96	− 8 58 51. 2	−2 32. 07	+ 0 3. 9	t25, 5	8. 324	0. 813	+1. 92	+ 2. 6
8	12 5 13	18 10 12. 41	− 9 20 7. 1	+0 40. 10	+ 0 59. 7	t25, 5	9. 093	0. 813	+1. 96	+ 2. 8
1918										
Oct. 3	12 6 15	1 0 47. 22	− 4 10 49. 0	+3 9. 69	− 8 45. 6	t25, 5	8. 093n	0. 777	+4. 54	+28. 7
3	12 6 15	1 0 46. 97	− 4 10 46. 4	+1 32. 97	+ 3 52. 3	t25, 5	8. 093n	0. 777	+4. 54	+28. 6
7	16 7 16	0 57 43. 71	− 4 47 19. 5	+2 6. 87	− 1 58. 9	t23, 5	9. 614	0. 758	+4. 55	+28. 5
7	16 7 16	0 57 43. 58	− 4 47 19. 0	−4 11. 46	− 3 7. 3	t25, 5	9. 614	0. 758	+4. 55	+28. 3
8	10 43 52	0 57 9. 80	− 4 53 50. 3	+1 34. 03	− 0 20. 1	t30, 6	9. 111n	0. 781	+4. 56	+28. 5
8	10 43 52	0 57 9. 73	− 4 53 51. 8	−0 2. 54	− 3 2. 5	t30, 6	9. 111n	0. 781	+4. 56	+28. 4
8	10 43 52	0 57 9. 92	− 4 53 52. 8	−0 13. 88	− 1 48. 8	t30, 6	9. 111n	0. 781	+4. 56	+28. 4
22	9 12 17	0 47 29. 41	− 6 33 54. 2	+3 41. 99	− 8 0. 2	t20, 5	9. 257n	0. 791	+4. 59	+28. 0
22	9 12 17	0 47 29. 23	− 6 33 54. 2	+2 19. 43	+ 2 38. 6	t20, 5	9. 257n	0. 791	+4. 59	+27. 9
22	9 12 17	0 47 28. 91	− 6 33 52. 6	+1 20. 05	+ 4 3. 3	t19, 5	9. 257n	0. 791	+4. 60	+27. 9
22	9 12 17	0 47 29. 22	− 6 33 54. 9	−0 10. 15	− 1 36. 0	t25, 5	9. 257n	0. 791	+4. 60	+27. 8

(40) HARMONIA

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pp α	Log pp δ	Star to App. Place α	Star to App. Place δ
1908										
July 29	11 58 6	21 4 20. 52	−21 33 1. 3	+1 0. 68	+ 0 37. 9	t25, 5	8. 892n	0. 881	+2. 27	+10. 1
Aug. 3	12 36 15	20 59 22. 07	−22 6 14. 0	−3 59. 90	− 3 9. 1	t20, 4	8. 754	0. 884	+2. 32	+10. 0
3	12 55 36	20 59 21. 14	−22 6 19. 1	−0 24. 87	+ 0 45. 8	t25, 5	8. 992	0. 882	+2. 32	+ 9. 8

(42) ISIS

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pp α	Log pp δ	Star to App. Place α	Star to App. Place δ
1909										
Apr. 10	9 2 0	13 10 29. 68	+ 6 15 14. 3	−1 45. 60	− 9 6. 1	t20, 4	9. 500n	0. 692	+1. 04	− 6. 6
16	12 10 33	13 4 36. 39	+ 6 40 28. 9	−0 26. 21	+12 41. 2	t30, 6	8. 951	0. 670	+1. 09	− 6. 2
17	10 7 3	13 3 44. 59	+ 6 43 39. 2	+1 38. 71	−12 12. 4	t25, 5	9. 166n	0. 672	+1. 08	− 6. 1

(43) ARIADNE

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pp α	Log pp δ	Star to App. Place α	Star to App. Place δ
1909										
Feb. 20	12 45 26	10 22 4. 42	+ 4 9 9. 9	−0 44. 40	+ 7 32. 1	t20, 4	8. 705	0. 698	+0. 74	− 3. 5

(49) PALES

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pp α	Log pp δ	Star to App. Place α	Star to App. Place δ
1908										
Jan. 29	9 50 53	8 23 7. 74	+17 57 49. 5	+2 26. 53	−10 10. 4	t25, 5	9. 382n	0. 532	+0. 56	− 3. 8
29	9 50 53	8 23 7. 55	+17 57 47. 9	+1 56. 72	− 9 38. 6	t25, 5	9. 382n	0. 532	+0. 56	− 3. 8
1917										
Oct. 6	11 3 18	0 44 5. 73	+10 36 35. 4	−1 5. 03	− 0 43. 3	t30, 6	8. 905n	0. 619	+4. 67	+29. 7
15	13 4 5	0 37 19. 17	+ 9 52 42. 5	+1 30. 05	+ 3 23. 6	t29, 6	9. 377	0 643	+4. 66	+30. 4
17	10 39 29	0 35 59. 36	+ 9 43 14. 5	+0 10. 23	− 6 4. 4	t30, 6	8. 394n	0. 630	+4. 67	+30. 4

(55) PANDORA

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pp α	Log pp δ	Star to App. Place α	Star to App. Place δ
1913										
Sept. 11	11 19 24	0 38 6. 53	+ 1 48 41. 1	−0 57. 65	− 1 32. 4	t30, 10	9. 347n	0. 725	+3. 43	+24. 0
22	13 35 6	0 28 56. 65	+ 1 31 21. 1	+1 52. 06	− 8 25. 7	t30, 6	9. 151	0. 726	+3. 56	+24. 3
24	12 52 37	0 27 10. 29	+ 1 27 44. 5	+3 37. 18	− 6 59. 2	t30, 6	8. 892	0. 726	+3. 59	+24. 4
Oct. 12	9 9 17	0 11 16. 32	+ 0 57 45. 8	+1 52. 36	+ 3 21. 6	t30, 6	9. 277n	0. 732	+3. 67	+24. 3
26	10 6 5	0 1 50. 13	+ 0 50 49. 4	−3 13. 78	+ 4 50. 2	t25, 5	8. 675	0. 732	+3. 64	+24. 0

(39) LAETITIA

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
18 18 37. 11	− 8 58 57. 7	AG Wien-Ottakring 6167	2	12	---	Fn.	
18 9 30. 35	− 9 21 9. 6	AG Wien-Ottakring 6127	2	12	---	Fn.	
0 57 32. 99	− 4 2 32. 1	AG Straszburg 228	--	12	---	C.	Practice obsn.
0 59 9. 46	− 4 15 7. 3	Ast Fer −4°0056, 123	--	12	---	C.	Practice obsn.
0 55 32. 29	− 4 45 49. 1	AG Straszburg 216	--	12	---	C.	Practice obsn.
1 1 50. 49	− 4 44 40. 0	AG Straszburg 242	--	12	---	C.	Practice obsn.
0 55 31. 21	− 4 53 58. 7	AG Straszburg 215	--	12	---	C.	Practice obsn.
0 57 7. 71	− 4 51 17. 7	AG Straszburg 225	--	12	---	C.	Practice obsn.
0 57 19. 24	− 4 52 32. 4	AG Straszburg 227	--	12	---	C.	Practice obsn.
0 43 42. 83	− 6 26 22. 0	AG Wien-Ottakring 157	--	12	---	C.	Practice obsn.
0 45 5. 21	− 6 37 0. 7	AG Wien-Ottakring 159	--	12	---	C.	Practice obsn.
0 46 4. 26	− 6 38 23. 8	AG Wien-Ottakring 162	--	12	---	C.	Practice obsn.
0 47 34. 77	− 6 32 46. 7	AG Wien-Ottakring 169	--	12	---	C.	Practice obsn.

(40) HARMONIA

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
21 3 17. 57	−21 33 49. 3	PGC Boss 5435	--	12	---	Fn.	
21 3 19. 65	−22 3 14. 9	AG Algiers 9068	2	12	---	Fn.	
20 59 43. 69	−22 7 14. 7	AG Algiers 9042	2	12	---	Fn.	

(42) ISIS

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
13 12 14. 24	+ 6 24 27. 0	AG Leipzig II 6363	2	12	115	Ep.	
13 5 1. 51	+ 6 27 53. 9	AG Leipzig II 6334	2	12	115	Ep.	
13 2 4. 80	+ 6 55 57. 7	AG Leipzig II 6321	3	12	115	Ep.	

(43) ARIADNE

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
10 22 48. 08	+ 4 1 41. 3	AG Albany 4045	3	12	160	Ep.	

(49) PALES

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
8 20 40. 65	+18 8 3. 7	AG Berlin A 3329	--	26	---	Fn.	
8 21 10. 27	+18 7 30. 3	AG Berlin A 3332	--	26	---	Fn.	
0 45 6. 09	+10 36 49. 0	Comp. with AG Leipzig II 229	--	12	---	C.	Practice obsn.
0 35 44. 46	+ 9 48 48. 5	AG Leipzig II 215	--	12	---	C.	Practice obsn.
0 35 44. 46	+ 9 48 48. 5	AG Leipzig II 215	--	12	---	C.	Practice obsn.

(55) PANDORA

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
0 39 0. 75	+ 1 49 49. 5	AG Albany 171	4	26	388	Ws.	Haze at times.
0 27 1. 03	+ 1 39 22. 5	AG Albany 96	3	26	183	Ws.	
0 23 29. 52	+ 1 34 19. 3	AG Albany 85	3	26	183	Ws.	
0 9 20. 29	+ 0 53 59. 9	AG Nicolajew 21	3	26	183	Ws.	Moonlight.
0 5 0. 27	+ 0 45 35. 2	AG Nicolajew 15	3	26	183	Ws.	

Date	W. M. T.	Apparent Place of Asteroid		Asteroid—Star		Comp.	Log pp		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
				(57) MNEMOSYNE						
1909	h m s	h m s	° ′ ″	m s	′ ″				s	″
Aug. 10	11 33 1	22 6 45. 11	+ 6 48 31. 9	+2 29. 82	− 4 51. 7	t24, 5	9. 185n	0. 671	+2. 16	+ 9. 4
10	11 58 26	22 6 44. 35	+ 6 48 26. 6	−1 26. 46	+ 7 59. 2	t25, 5	9. 017n	0. 669	+2. 15	+ 9. 5
21	10 45 20	21 59 25. 45	+ 5 49 41. 1	+3 10. 71	− 3 59. 9	t25, 5	9. 168n	0. 682	+2. 26	+10. 9
				(64) ANGELINA						
1918										
Mar. 17	11 49 2	10 51 25. 63	+ 5 49 44. 9	−0 53. 54	+ 7 18. 5	t25, 5	8. 873	0. 681	+2. 96	−18. 3
19	12 6 5	10 49 53. 87	+ 5 58 24. 6	+0 12. 92	+ 2 38. 9	t30, 6	9. 102	0. 680	+2. 96	−18. 3
				(68) LETO						
1918										
Nov. 6	11 51 20	1 18 18. 85	+ 4 31 47. 3	+5 44. 64	− 6 4. 5	t30, 6	9. 268	0. 698	+4. 75	+27. 8
6	11 51 20	1 18 19. 05	+ 4 31 43. 1	+3 25. 20	− 4 56. 3	t30, 6	9. 268	0. 698	+4. 75	+27. 6
6	11 51 20	1 18 18. 50	+ 4 31 45. 4	+1 37. 22	− 3 58. 6	t25, 6	9. 268	0. 698	+4. 76	+27. 6
				(78) DIANA						
1918										
Mar. 2	11 0 50	10 6 34. 58	+11 13 35. 4	−2 56. 99	− 1 2. 6	t25, 5	8. 709n	0. 609	+2. 95	−16. 3
				(79) EURYNOME						
1908										
June 23	10 5 14	16 53 17. 88	−16 47 13. 8	−0 43. 85	− 1 27. 3	t30, 6	8. 925n	0. 858	+1. 83	− 1. 2
26	11 34 21	16 50 36. 89	−16 42 34. 8	−0 8. 00	− 2 56. 5	t30, 6	9. 114	0. 855	+1. 84	− 1. 1
				(88) THISBE						
1917										
Sept. 18	9 58 33	23 10 58. 73	+ 4 7 6. 7	−1 12. 69	+ 4 30. 2	t30, 6	9. 208n	0. 701	+4. 45	+28. 5
19	11 16 32	23 10 9. 08	+ 4 1 44. 4	−2 2. 36	− 0 52. 5	t30, 5	6. 840	0. 699	+4. 47	+28. 9
				(90) ANTIOPE						
1908										
Feb. 6	8 16 59	8 46 34. 84	+20 43 23. 6	+0 39. 72	+ 4 0. 5	t25, 5	9. 583n	0. 561	+0. 64	− 3. 8
				(93) MINERVA						
1908										
Sept. 1	11 58 54	22 45 10. 06	−14 55 45. 2	−2 5. 16	− 0 44. 4	t25, 5	7. 707n	0. 850	+2. 39	+14. 0
3	10 44 1	22 43 19. 35	−14 58 48. 3	+2 5. 69	+ 2 9. 3	t25, 5	9. 140n	0. 846	+2. 41	+13. 9
6	11 0 26	22 40 30. 30	−15 2 46. 0	+1 4. 37	+ 2 40. 3	t25, 5	8. 878n	0. 849	+2. 43	+13. 9
6	11 10 35	22 40 29. 84	−15 2 46. 8	−0 43. 84	− 1 49. 2	t25, 5	8. 738n	0. 850	+2. 43	+13. 9
6	11 24 16	22 40 29. 44	−15 2 47. 1	+0 59. 45	+ 6 31. 1	t25, 5	8. 422n	0. 850	+2. 43	+13. 9

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
(57) MNEMOSYNE							
h m s	° ′ ″			in.			
22 4 13.13	+ 6 53 14.2	AG Leipzig II 11121	3	12	---	Fn.	
22 8 8.66	+ 6 40 17.9	AG Leipzig II 11158	--	12	---	Fn.	
21 56 12.48	+ 5 53 30.1	AG Leipzig II 11064	3	12	---	Fn.	
(64) ANGELINA							
10 52 16.21	+ 5 42 44.7	AG Leipzig II 5634	3	12	---	C.	Practice obsn.
10 49 37.99	+ 5 56 4.0	AG Leipzig II 5625	--	12	---	C.	Practice obsn.
(68) LETO							
1 12 29.46	+ 4 37 24.0	AG Albany 347	--	12	---	C.	Practice obsn.
1 14 49.10	+ 4 36 11.8	AG Albany 361	--	12	---	C.	Practice obsn.
1 16 36.52	+ 4 35 16.4	AG Albany 367	--	12	---	C.	Practice obsn.
(78) DIANA							
10 9 28.62	+11 14 54.3	AG Leipzig I 3969	3	12	---	C.	Practice obsn.
(79) EURYNOME							
16 53 59.90	−16 45 45.3	AG Washington 6073	2	12	---	Fn.	
16 50 43.05	−16 39 37.2	AG Washington 6052	2	12	---	Fn.	
(88) THISBE							
23 12 6.97	+ 4 2 8.0	AG Albany 8030	--	12	---	C.	Practice obsn.
23 12 6.97	+ 4 2 8.0	AG Albany 8030	--	12	---	C.	Practice obsn.
(90) ANTIOPE							
8 45 54.48	+20 39 26.9	AG Berlin B 3562	4	26	---	Fn.	Ft. Objects diffuse.
(93) MINERVA							
22 47 12.83	−14 55 14.8	AG Washington 8485	--	26	---	Fn.	
22 41 11.25	−15 1 11.5	AG Washington 8458	2	26	---	Fn.	
22 39 23.50	−15 5 40.2	AG Washington 8443	--	26	---	Fn.	
22 41 11.25	−15 1 11.5	AG Washington 8458	--	26	---	Fn.	
22 39 27.56	−15 9 32.1	AG Washington 8444	4	26	---	Fn.	

Date	W. M. T.	Apparent Place of Asteroid		Asteroid—Star		Comp.	Log pρ		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
(95) ARETHUSA										
1909	h m s	h m s	° ′ ″	m s	′ ″				s	″
Aug. 7	10 42 2	20 7 54. 06	− 2 19 25. 7	−1 44. 97	+ 6 20. 7	t30, 6	8. 638n	0. 761	+2. 21	+ 6. 4
1910										
Nov. 22	10 23 10	3 47 1. 51	+21 38 11. 8	−1 46. 70	− 2 46. 7	t25, 5	9. 220n	0. 436	+3. 54	+16. 1
26	9 25 38	3 43 41. 44	+21 5 59. 3	−0 6. 93	+ 1 44. 8	t30, 6	9. 381n	0. 474	+3. 54	+16. 5
30	9 15 16	3 40 27. 01	+20 33 35. 0	−0 53. 55	− 2 34. 3	t29, 6	9. 349n	0. 478	+3. 55	+16. 6
(101) HELENA										
1908										
Mar. 7	8 57 15	10 55 0. 46	+ 6 44 57. 4	−0 59. 14	+ 9 15. 9	t30, 6	9. 505n	0. 688	+0. 81	− 5. 3
7	9 12 2	10 54 59. 67	+ 6 44 58. 2	−0 17. 01	+ 9 35. 4	t15, 5	9. 474n	0. 685	+0. 81	− 5. 4
9	10 11 14	10 53 1. 83	+ 6 50 35. 5	+1 46. 08	+10 5. 2	t25, 5	9. 256n	0. 673	+0. 82	− 5. 4
10	9 35 45	10 52 6. 00	+ 6 53 14. 4	+0 1. 49	+ 5 17. 0	t30, 6	9. 372n	0. 677	+0. 82	− 5. 5
10	9 35 45	10 52 5. 99	+ 6 53 15. 0	−3 35. 87	+ 7 23. 4	t30, 6	9. 372n	0. 677	+0. 82	− 5. 5
1918										
Nov. 3	12 51 6	0 39 14. 83	+16 41 19. 3	+2 5. 84	+ 9 45. 0	t36, 8	9. 547	0. 595	+4. 75	+31. 2
3	12 53 15	0 39 14. 81	+16 41 20. 4	+1 42. 63	+10 50. 0	t29, 7	9. 551	0. 597	+4. 75	+31. 2
3	12 51 6	0 39 14. 85	+16 41 17. 0	−2 10. 98	+ 4 28. 9	t36, 8	9. 547	0. 595	+4. 77	+31. 0
3	12 51 6	0 39 15. 01	+16 41 19. 9	−4 23. 80	+10 3. 0	t36, 8	9. 547	0. 595	+4. 78	+30. 9
3	12 51 6	0 39 14. 79	+16 41 17. 9	−5 29. 92	+10 53. 9	t35, 8	9. 547	0. 595	+4. 79	+30. 9
7	8 42 29	0 37 1. 26	+16 29 18. 5	−0 7. 73	− 2 16. 7	t46, 10	9. 003n	0. 528	+4. 75	+32. 1
7	8 42 29	0 37 1. 26	+16 29 20. 3	−0 30. 92	− 1 10. 9	t46, 10	9. 003n	0. 528	+4. 75	+32. 0
14	11 44 6	0 34 2. 09	-- -- ----	+3 5. 02	-- ----	t25, 0	9. 494	-----	+4. 66	----
14	11 44 6	0 34 2. 19	-- -- ----	+2 23. 75	-- ----	t25, 0	9. 494	-----	+4. 66	----
14	11 44 6	0 34 1. 92	-- -- ----	+0 55. 73	-- ----	t25, 0	9. 494	-----	+4. 67	----
14	11 44 6	0 34 1. 87	-- -- ----	−2 12. 46	-- ----	t25, 0	9. 494	-----	+4. 69	----
14	11 44 6	0 34 2. 17	-- -- ----	−3 56. 70	-- ----	t25, 0	9. 494	-----	+4. 70	----
14	11 44 6	0 34 2. 25	-- -- ----	−4 37. 86	-- ----	t25, 0	9. 494	-----	+4. 71	----
(104) KLYMENE										
1913										
Oct. 22	8 51 49	1 3 39. 28	+ 5 0 40. 7	−1 21. 30	+ 1 19. 2	t30, 6	9. 387n	0. 696	+3. 78	+26. 2
(105) ARTEMIS										
1908										
Aug. 30	10 18 4	22 13 50. 98	+ 9 44 14. 1	+2 35. 17	+ 8 39. 3	t25, 5	9. 201n	0. 636	+2. 28	+13. 4
31	10 56 42	22 13 0. 67	+ 9 27 59. 8	−0 51. 90	+ 1 47. 0	t25, 5	8. 868n	0. 634	+2. 28	+13. 5
Sept. 1	11 8 2	22 12 16. 24	+ 9 13 10. 0	+0 25. 53	+ 1 4. 9	t18, 6	8. 618n	0. 637	+2. 29	+13. 6
8	9 54 47	22 7 14. 35	+ 7 22 34. 2	−1 47. 15	− 5 43. 1	t25, 5	9. 086n	0. 663	+2. 30	+14. 5
8	10 11 37	22 7 13. 96	+ 7 22 24. 6	−1 21. 90	+ 3 19. 7	t25, 5	8. 949n	0. 662	+2. 29	+14. 5
(111) ATE										
1908										
Aug. 31	10 7 15	0 7 11. 06	+ 6 59 3. 0	−3 3. 56	−13 0. 0	t20, 4	9. 548n	0. 792	+2. 19	+13. 2
Sept. 12	10 14 40	23 57 51. 26	+ 6 25 13. 4	+3 13. 73	+ 3 44. 0	t20, 4	9. 411n	0. 684	+2. 35	+14. 8
15	10 51 33	23 55 14. 32	+ 6 13 41. 0	+0 36. 76	− 7 48. 7	t25, 5	9. 221n	0. 679	+2. 38	+15. 1
16	9 52 42	23 54 23. 90	+ 6 9 52. 8	−0 44. 17	+ 0 11. 5	t25, 5	9. 419n	0. 687	+2. 39	+15. 3
23	10 3 7	23 48 8. 22	+ 5 38 57. 8	−2 4. 75	+ 3 0. 9	t30, 6	9. 266n	0. 686	+2. 43	+15. 9
30	8 35 52	23 42 4. 29	+ 5 5 25. 3	−3 16. 47	+11 55. 5	t25, 5	9. 443n	0. 698	+2. 44	+16. 2
Oct. 6	12 29 50	23 37 2. 09	+ 4 34 58. 8	+0 57. 47	− 6 9. 5	t25, 5	9. 342	0. 699	+2. 42	+16. 6

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
(95) ARETHUSA							
h m s	° ′ ″			in.			
20 9 36.82	− 2 25 52.8	AG Straszburg 6964	4	12	115	Ep.	
3 48 44.67	+21 40 42.4	AG Berlin B 1242	2	12	---	Ep.	
3 43 44.83	+21 3 58.0	AG Berlin B 1194	2	12	---	Ep.	
3 41 17.01	+20 35 52.7	AG Berlin B 1156	4	12	---	Ep.	Interrupted by clds.
(101) HELENA							
10 55 58.79	+ 6 35 46.8	AG Leipzig II 5657	--	26	---	Fn.	
10 55 15.87	+ 6 35 28.2	AG Leipzig II 5654	5	26	---	Fn.	
10 51 14.93	+ 6 40 35.7	AG Leipzig II 5632	--	26	---	Hd.	
10 52 3.69	+ 6 48 2.9	Battermann 611	--	26	---	Fn.	
10 55 41.04	+ 6 45 57.1	Battermann 615	--	26	---	Fn.	
0 37 4.24	+16 31 3.1	AG Berlin A 185	--	12	---	C.	Practice obsn.
0 37 27.43	+16 29 59.2	AG Berlin A 188	--	12	---	C.	Practice obsn.
0 41 21.06	+16 36 17.1	Bonn 296	--	12	---	C.	Practice obsn.
0 43 34.03	+16 30 46.0	AG Berlin A 214	--	12	---	C.	Practice obsn.
0 44 39.92	+16 29 53.1	PGC Boss 174	--	12	---	C.	Practice obsn.
0 37 4.24	+16 31 3.1	AG Berlin A 185	--	12	---	C.	Practice obsn.
0 37 27.43	+16 29 59.2	AG Berlin A 188	--	12	---	C.	Practice obsn.
0 30 52.41	-- -- ----	AG Berlin A 164	--	12	---	C.	Practice obsn. Too ft. to observe δ. Brt. moonlight.
0 31 33.78	-- -- ----	AG Berlin A 168	--	12	---	C.	Practice obsn.
0 33 1.52	-- -- ----	AG Berlin A 171	--	12	---	C.	Practice obsn.
0 36 9.64	-- -- ----	AG Berlin A 181	--	12	---	C.	Practice obsn.
0 37 54.17	-- -- ----	AG Berlin A 192	--	12	---	C.	Practice obsn.
0 38 35.40	-- -- ----	AG Berlin A 195	--	12	---	C.	Practice obsn.
(104) KLYMENE							
1 4 56.80	+ 4 58 55.3	AG Albany 310	3	26	183	Ws.	
(105) ARTEMIS							
22 11 13.53	+ 9 35 21.4	AG Leipzig II 11191	2	26	---	Fn.	
22 13 50.29	+ 9 25 59.3	AG Leipzig II 11208	2	26	---	Fn.	
22 11 48.42	+ 9 11 51.5	AG Leipzig II 11197	2	26	---	Fn.	
22 8 59.20	+ 7 28 2.8	AG Leipzig II 11166	2	26	---	Fn.	
22 8 33.57	+ 7 18 50.4	AG Leipzig II 11161	2	26	---	Fn.	
(111) ATE							
0 10 12.43	+ 7 11 49.8	Küstner 60	--	26	---	Fn.	$11^m.0$.
23 54 35.18	+ 6 21 14.6	Newcomb's Fund. Cat. 1592	--	26	---	Fn.	
23 54 35.18	+ 6 21 14.6	Newcomb's Fund. Cat. 1592	4	26	---	Fn.	$10^m.4$.
23 55 5.68	+ 6 9 26.0	AG Leipzig II 11842	4	26	---	Fn.	Sky thick.
23 50 10.54	+ 5 35 41.0	AG Leipzig II 11810	--	26	---	Fn.	
23 45 18.32	+ 4 53 13.6	AG Albany 8169	1	26	---	Fn.	$10^m.3$.
23 36 2.20	+ 4 40 51.7	AG Albany 8135	1	26	---	Fn.	

1757—29——11

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
				(115) THYRA						
	h m s	h m s	° ′ ″	m s	′ ″				s	″
1908 Sept. 30	11 8 58	0 11 7. 09	+23 20 2. 9	+1 0. 12	+ 2 52. 8	t25, 5	8. 719n	0. 371	+2. 57	+16. 0
Oct. 14	9 56 50	23 57 10. 57	+22 42 58. 2	−3 1. 68	− 2 47. 3	t25, 5	8. 771n	0. 388	+2. 55	+18. 4
1912 Dec. 21	13 49 10	6 0 58. 86	+37 38 52. 4	−2 9. 46	+ 0 13. 1	t30, 6	9. 426	9. 805	+5. 51	+ 8. 0
22	11 34 34	5 59 48. 28	+37 32 15. 8	−1 31. 73	− 4 8. 4	t30, 6	8. 697n	9. 297	+5. 52	+ 8. 3
1913 Jan. 14	12 42 25	5 36 20. 66	+33 56 26. 2	−2 15. 69	− 2 31. 5	t25, 5	9. 554	0. 219	+1. 45	+11. 3
18	10 43 59	5 34 18. 12	+33 16 6. 5	−2 58. 13	− 0 28. 7	t24, 8	9. 161	9. 987	+1. 43	+11. 3
25	12 46 56	5 32 16. 97	+32 4 50. 5	−2 44. 72	+ 1 4. 1	t12, 4	9. 638	0. 398	+1. 40	+11. 8
				(121) HERMIONE						
1908 Jan. 27	9 12 41	7 28 20. 03	+28 14 41. 5	+2 53. 58	+ 3 4. 5	t25, 5	9. 386n	0. 296	+0. 54	− 2. 4
27	9 36 15	7 28 19. 19	+28 14 44. 5	+3 22. 00	+ 8 42. 2	t14, 3	9. 289n	0. 264	+0. 54	− 2. 4
27	9 54 3	7 28 18. 55	+28 14 45. 9	+4 12. 48	+ 8 24. 6	t15, 3	9. 195n	0. 243	+0. 54	− 2. 4
30	9 47 30	7 26 4. 95	+28 20 36. 6	+2 27. 69	+ 2 7. 1	t24, 5	9. 148n	0. 232	+0. 55	− 2. 3
30	9 47 30	7 26 4. 78	+28 20 34. 2	−3 7. 52	− 7 16. 1	t25, 5	9. 148n	0. 232	+0. 56	− 2. 4
				(127) JOHANNA						
1913 Oct. 31	9 32 36	0 52 18. 24	+ 3 17 56. 6	+3 52. 38	− 3 17. 5	t30, 6	8. 906n	0. 708	+3. 74	+25. 6
Nov. 2	9 43 34	0 50 52. 10	+ 3 15 39. 6	+2 26. 23	− 5 34. 5	t30, 6	8. 606n	0. 708	+3. 75	+25. 6
4	9 30 39	0 49 31. 28	+ 3 13 51. 0	+4 29. 57	− 1 36. 7	t25, 5	8. 679n	0. 708	+3. 75	+25. 6
6	9 2 38	0 48 15. 65	+ 3 12 31. 5	+3 13. 95	− 2 56. 1	t30, 6	8. 931n	0. 709	+3. 74	+25. 5
17	8 13 15	0 42 51. 65	+ 3 14 16. 1	+1 9. 54	− 3 37. 3	t30, 6	8. 938n	0. 708	+3. 68	+25. 0
21	7 26 43	0 41 37. 31	+ 3 18 50. 1	+1 10. 39	+ 4 33. 9	t30, 6	9. 158n	0. 709	+3. 66	+24. 8
				(129) ANTIGONE						
1908 July 20	11 11 36	17 35 38. 54	−10 40 14. 4	+1 22. 30	− 1 27. 1	t25, 5	9. 251	0. 818	+1. 91	+ 2. 0
20	11 26 52	17 35 38. 22	−10 40 19. 0	+0 28. 77	− 5 6. 5	t25, 5	9. 315	0. 816	+1. 91	+ 2. 0
				(133) CYRENE						
1908 Jan. 3	10 45 19	7 11 27. 02	+28 33 52. 2	−0 45. 02	− 5 22. 3	t25, 5	9. 328n	0. 264	+0. 31	− 3. 4
5	9 45 27	7 9 35. 46	+28 34 32. 4	+0 41. 92	− 1 26. 7	t25, 5	9. 493n	0. 342	+0. 35	− 3. 2
5	9 59 54	7 9 34. 77	+28 34 31. 4	+1 30. 52	− 4 26. 7	t25, 5	9. 454n	0. 318	+0. 35	− 3. 2
10	9 55 45	7 4 48. 72	+28 35 0. 2	−1 16. 62	− 4 24. 0	t25, 5	9. 389n	0. 286	+0. 41	− 2. 9
10	9 55 45	7 4 48. 73	+28 34 59. 8	−2 5. 11	− 4 8. 7	t25, 5	9. 389n	0. 286	+0. 41	− 2. 9
				(135) HERTHA						
1917 Oct. 17	11 18 49	1 24 36. 22	+11 54 37. 1	−0 29. 91	− 3 28. 3	t30, 6	8. 639n	0. 599	+4. 80	+28. 8
				(150) NUWA						
1908 Feb. 1	12 27 44	7 59 59. 26	+17 27 30. 5	−2 4. 88	+ 0 55. 8	t25, 5	9. 170	0. 517	+0. 57	− 3. 8

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
(115) THYRA							
h m s	° ′ ″			in.			
0 10 4. 40	+23 16 54. 1	AG Berlin B 42	1	12	---	Fn.	
0 0 9. 70	+22 45 27. 1	AG Berlin B 9203	1	12	---	Fn.	
6 3 2. 81	+37 38 31. 3	AG Lund 3126	--	26	183	Ws.	Haze and clds. First 2 with br. field.
6 1 14. 49	+37 36 15. 9	AG Lund 3104	3	26	183	Ws.	
5 38 34. 90	+33 58 46. 4	AG Leiden 2250	2	26	183	Ws.	
5 37 14. 82	+33 16 23. 9	AG Leiden 2235	3	26	367	Ws.	Prism eyepiece.
5 35 0. 29	+32 3 34. 6	AG Leiden 2217	4	26	367	Ws.	Prism eyepiece.
(121) HERMIONE							
7 25 25. 91	+28 11 39. 4	AG Cambridge 4006	--	26	---	Fn.	
7 24 56. 65	+28 6 4. 7	AG Cambridge 3997	--	26	---	Fn.	
7 24 5. 53	+28 6 23. 7	AG Cambridge 3988	--	26	---	Fn.	
7 23 36. 71	+28 18 31. 8	AG Cambridge 3985	--	26	---	Fn.	
7 29 11. 74	+28 27 52. 7	AG Cambridge 4049	--	26	---	Fn.	
(127) JOHANNA							
0 48 22. 12	+ 3 20 48. 5	AG Albany 222	3	26	183	Ws.	10ᵐ.5.
0 48 22. 12	+ 3 20 48. 5	AG Albany 222	2	26	183	Ws.	
0 44 57. 96	+ 3 15 2. 1	AG Albany 209	4	26	183	Ws.	
0 44 57. 96	+ 3 15 2. 1	AG Albany 209	2	26	183	Ws.	
0 41 38. 43	+ 3 17 28. 4	Comp. with AG Albany 183	2	26	183	Ws.	Haze.
0 40 23. 26	+ 3 13 51. 4	AG Albany 177	2	26	183	Ws.	
(129) ANTIGONE							
17 34 14. 33	−10 38 49. 3	AG Harvard 6032	2	12	---	Fn.	
17 35 7. 54	−10 35 14. 5	AG Harvard 6042	2	12	---	Fn.	
(133) CYRENE							
7 12 11. 73	+28 39 17. 9	AG Cambridge 3870	--	26	---	Hd.	
7 8 53. 19	+28 36 2. 3	AG Cambridge 3834	--	26	---	Hd.	
7 8 3. 90	+28 39 1. 3	AG Cambridge 3826	--	26	---	Hd.	
7 6 4. 93	+28 39 27. 1	AG Cambridge 3794	--	26	---	Hd.	
7 6 53. 43	+28 39 11. 4	AG Cambridge 3810	--	26	---	Hd.	
(135) HERTHA							
1 25 1. 33	+11 57 36. 6	AG Leipzig I 422		12	--	C.	Practice obsn.
(150) NUWA							
8 2 3. 57	+17 26 38. 5	AG Berlin A 3198	4	26	---	Fn.	Wind shakes telescope.

(161) ATHOR

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1908	h m s	h m s	° ′ ″	m s	′ ″				s	″
Jan. 3	9 53 51	6 52 16. 10	+37 10 12. 1	−0 58. 41	− 3 8. 3	t25, 5	9. 486n	9. 944	+0. 39	− 3. 1
3	10 6 22	6 52 15. 41	+37 10 12. 2	−1 0. 96	− 3 22. 5	t25, 5	9. 446n	9. 882	+0. 39	− 3. 1
5	8 52 46	6 49 45. 51	+37 12 46. 1	+1 16. 82	+ 9 32. 3	t25, 5	9. 608n	0. 160	+0. 42	− 2. 7
5	9 7 0	6 49 44. 84	+37 12 46. 9	−0 17. 56	+ 8 49. 0	t15, 5	9. 579n	0 104	+0. 42	− 2. 8
10	7 32 6	6 43 31. 78	+37 15 43. 8	+0 19. 32	+ 5 31. 8	t18, 6	9. 691n	0. 346	+0. 47	− 2. 0

(182) ELSA

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1908										
Mar. 4	11 17 3	9 30 26. 73	+17 8 1. 1	−2 27. 84	− 6 50. 0	t25, 5	8. 882	0. 513	+0. 73	− 3. 9
9	12 43 57	9 27 7. 03	+17 24 6. 0	+3 10. 26	− 6 54. 9	t25, 5	9. 457	0. 557	+0. 68	− 3. 6

(190) ISMENE

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1910										
Nov. 26	10 36 49	4 0 33. 77	+12 39 32. 5	+1 58. 64	+ 0 15. 8	t25, 5	9. 105n	0. 593	+3. 42	+15. 4

(192) NAUSIKAA

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1918										
Sept. 9	16 20 15	1 8 6. 17	+12 11 39. 5	+3 9. 72	− 4 3. 4	t40, 8	9. 446	0. 625	+4. 38	+25. 2
14	13 13 4	1 5 47. 74	+12 38 41. 7	−2 24. 35	+ 2 3. 9	t25, 5	8. 591n	0. 588	+4. 48	+25. 7
15	11 6 43	1 5 15. 95	+12 43 15. 4	+3 19. 25	− 6 1. 4	t25, 5	9. 433n	0. 616	+4. 51	+26. 1
23	15 11 29	0 59 29. 53	+13 16 30. 2	−2 51. 77	−10 46. 4	t24, 5	9. 434	0. 609	+4. 61	+26. 8
27	14 21 2	0 56 6. 23	+13 27 34. 7	−3 30. 51	− 2 41. 4	t25, 5	9. 336	0. 595	+4. 68	+27. 5
Oct. 8	9 3 29	0 45 53. 23	+13 42 2. 9	+3 27. 35	+ 8 13. 4	t24, 5	9. 469n	0. 610	+4. 72	+29. 1
8	9 3 29	0 45 52. 83	+13 42 1. 4	+0 41. 85	+ 8 26. 0	t24, 4	9. 469n	0. 610	+4. 72	+29. 0
8	9 3 29	0 45 53. 06	+13 42 1. 3	−1 7. 02	+ 3 10. 8	t24, 5	9. 469n	0. 610	+4. 72	+28. 9
8	9 3 29	0 45 53. 26	+13 42 1. 1	−2 45. 57	− 0 46. 3	t24, 5	9. 469n	0. 610	+4. 73	+28. 9
22	8 2 6	0 33 39. 29	+13 36 11. 8	+1 24. 84	+ 7 46. 3	t25, 5	9. 454n	0. 608	+4. 72	+30. 5
22	8 2 6	0 33 39. 38	+13 36 12. 2	−1 43. 09	+ 4 11. 5	t25, 5	9. 454n	0. 608	+4. 74	+30. 4
22	8 2 6	0 33 39. 14	+13 36 10. 5	−1 58. 48	+ 2 16. 7	t25, 5	9. 454n	0. 608	+4. 74	+30. 4

(198) AMPELLA

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1908										
Feb. 1	11 13 37	5 52 9. 03	+19 46 20. 8	+0 58. 58	+2 40. 2	t25, 5	9. 402	0. 504	+0. 25	− 2. 9
3	8 47 16	5 51 38. 51	+19 42 32. 6	+2 8. 46	−1 21. 7	t25, 5	8. 440n	0. 458	+0. 23	− 2. 8
1918										
Sept. 13	8 16 13	22 6 30. 03	+ 8 8 46. 3	−1 42. 86	+5 1. 9	t25, 5	9. 427n	0. 668	+4. 33	+27. 9
14	10 44 25	22 5 46. 47	+ 8 3 35. 2	+1 46. 67	+2 30. 0	t25, 5	8. 378	0. 652	+4. 34	+27. 9
15	8 54 6	22 5 12. 01	+ 7 59 3. 2	+3 11. 45	+2 23. 9	t25, 5	9. 266n	0. 660	+4. 31	+27. 9
23	8 12 27	22 1 12. 95	+ 7 16 8. 5	+2 9. 30	+1 9. 3	t25, 5	9. 292n	0. 669	+4. 26	+28. 3
27	12 51 6	21 59 54. 86	+ 6 50 21. 0	+0 8. 08	+3 31. 3	t29, 6	9. 541	0. 692	+4. 26	+28. 8
Oct. 3	10 29 30	21 59 8. 46	+ 6 17 30. 5	+3 2. 13	−2 24. 0	t25, 5	9. 188	0. 677	+4. 18	+28. 7
3	10 29 30	21 59 8. 46	+ 6 17 30. 1	−2 6. 74	+0 40. 7	t25, 5	9. 188	0. 677	+4. 20	+28. 8

(202) CHRYSEIS

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1909										
Mar. 23	11 59 2	12 30 38. 92	+ 7 19 45. 8	−2 4. 02	−1 55. 5	t25, 5	8. 741n	0. 661	+0. 93	− 6. 3
26	11 2 6	12 28 31. 38	+ 7 40 2. 9	+2 28. 66	+2 41. 9	t25, 5	9. 146n	0. 661	+0. 95	− 6. 2
28	10 1 27	12 27 6. 76	+ 7 52 58. 0	−1 51. 66	+6 5. 3	t25, 5	9. 370n	0. 666	+0. 98	− 6. 2

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
		(161) ATHOR					
h m s	° ′ ″			in.			
6 53 14.12	+37 13 23.5	AG Lund 3615	--	26	---	Hd.	
6 53 15.98	+37 13 37.8	AG Lund 3617	--	26	---	Hd.	
6 48 28.27	+37 3 16.5	AG Lund 3587	--	26	---	Hd.	
6 50 1.98	+37 4 0.7	AG Lund 3597	--	26	---	Hd.	
6 43 11.99	+37 10 14.0	AG Lund 3526	--	26	---	Hd.	
		(182) ELSA					
9 32 53.84	+17 14 55.0	AG Berlin A 3877	2	12	---	Fn.	
9 23 56.09	+17 31 4.5	AG Berlin A 3826	2	12	---	Fn.	
		(190) ISMENE					
3 58 31.71	+12 39 1.3	AG Leipzig I 1187	2	12	---	Ep.	
		(192) NAUSIKAA					
1 4 52.07	+12 15 17.7	AG Leipzig I 311	4	12	---	C.	Practice obsn.
1 8 7.61	+12 36 12.1	AG Leipzig I 332	2½	12	---	C.	Practice obsn.
1 1 52.19	+12 48 50.7	AG Leipzig I 292	--	12	---	C.	Practice obsn.
1 2 16.69	+13 26 49.8	AG Leipzig I 294	--	12	---	C.	Practice obsn.
0 59 32.06	+13 29 48.6	AG Leipzig I 277	--	12	---	C.	Practice obsn.
0 42 21.16	+13 33 20.4	AG Leipzig I 206	--	12	---	C.	Practice obsn.
0 45 6.26	+13 33 6.4	AG Leipzig I 219	--	12	---	C.	Practice obsn.
0 46 55.36	+13 38 21.6	AG Leipzig I 227	--	12	---	C.	Practice obsn.
0 48 34.10	+13 42 18.5	AG Leipzig I 236	--	12	---	C.	Practice obsn.
0 32 9.73	+13 27 54.9	Bonn 236	--	12	---	C.	Practice obsn.
0 35 17.73	+13 31 30.3	AG Leipzig I 159	--	12	---	C.	Practice obsn.
0 35 32.88	+13 33 23.4	AG Leipzig I 162	--	12	---	C.	Practice obsn.
		(198) AMPELLA					
5 51 10.20	+19 43 43.5	AG Berlin A 1771	--	26	---	Fn.	
5 49 29.82	+19 43 57.1	AG Berlin A 1758	--	26	---	Fn.	
22 8 8.56	+ 8 3 16.5	AG Leipzig II 11155	3½	12	---	C.	Practice obsn.
22 3 55.46	+ 8 0 37.3	AG Leipzig II 11116	2½	12	---	C.	Practice obsn.
22 1 56.24	+ 7 56 11.4	Bonn 9791	2½	12	---	C.	Practice obsn.
21 58 59.39	+ 7 14 30.9	AG Leipzig II 11085	2	12	---	C.	Practice obsn.
21 59 42.52	+ 6 46 20.9	AG Leipzig II 11093	--	12	---	C.	Practice obsn.
21 56 2.15	+ 6 19 25.8	AG Leipzig II 11054	--	12	---	C.	Practice obsn.
22 1 11.00	+ 6 16 20.6	AG Leipzig II 11102	--	12	---	C.	Practice obsn.
		(202) CHRYSEIS					
12 32 42.01	+ 7 21 47.6	AG Leipzig II 6179	2	12	160	Ep.	
12 26 1.77	+ 7 37 27.2	AG Leipzig II 6146	2	12	115	Ep.	
12 28 57.44	+ 7 46 58.9	AG Leipzig II 6164	2	12	115	Ep.	

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
(203) POMPEJA										
1908	h m s	h m s	° ′ ″	m s	′ ″				s	″
Jan. 27	11 25 8	7 10 38. 55	+26 32 56. 1	−1 36. 13	+3 6. 0	t25, 5	8. 934	0. 278	+0. 51	− 2. 4
27	11 41 21	7 10 38. 07	+26 32 56. 0	−0 57. 67	+1 20. 6	t25, 5	9. 084	0. 288	+0. 51	− 2. 4
(221) EOS										
1909										
Apr. 15	11 46 40	13 51 25. 32	+ 3 33 33. 6	+1 50. 73	−2 32. 8	t25, 5	8. 776*n*	0. 705	+1. 10	− 7. 2
16	11 49 1	13 50 41. 34	+ 3 39 13. 2	+1 7. 89	−5 28. 2	t25, 5	8. 660*n*	0. 703	+1. 10	− 7. 2
22	11 58 10	13 46 16. 99	+ 4 10 52. 2	−1 52. 46	+6 0. 1	t25, 5	8. 457	0. 698	+1. 14	− 6. 7
(229) ADELINDA										
1908										
Oct. 26	9 41 40	2 41 18. 96	+16 11 56. 6	−5 29. 36	+4 32. 5	t15, 3	9. 484*n*	0. 581	+2. 83	+13. 0
30	14 14 2	2 38 3. 32	+15 59 31. 1	−0 38. 97	−1 18. 1	t30, 6	9. 416	0. 569	+2. 88	+13. 6
Nov. 1	13 14 52	2 36 31. 05	+15 53 34. 8	+0 47. 14	+4 55. 7	t35, 7	9. 226	0. 548	+2. 89	+14. 0
12	9 1 59	2 28 12. 59	+15 20 9. 1	−0 19. 27	+9 6. 4	t17, 6	9. 372*n*	0. 572	+2. 95	+14. 5
15	8 58 48	2 26 2. 42	+15 11 9. 1	+2 7. 34	−0 28. 2	t25, 5	9. 333*n*	0. 569	+2. 95	+14. 9
18	8 47 50	2 23 58. 61	+15 2 31. 6	−0 54. 16	+4 7. 0	t25, 5	9. 322*n*	0. 570	+2. 96	+14. 9
22	9 20 12	2 21 22. 55	+14 51 28. 3	+3 5. 40	−8 19. 6	t20, 4	9. 047*n*	0. 557	+2. 95	+15. 1
27	8 38 27	2 18 31. 14	+14 39 23. 1	−1 34. 70	+0 16. 2	t25, 5	9. 175*n*	0. 565	+2. 96	+15. 1
(241) GERMANIA										
1909										
Apr. 10	11 50 26	13 50 48. 76	−18 54 37. 0	+0 41. 39	−1 46. 9	t25, 5	8. 977*n*	0. 868	+1. 03	− 6. 2
11	10 51 14	13 50 5. 28	−18 50 41. 9	−1 24. 59	−3 22. 7	t25, 5	9. 310*n*	0. 858	+1. 05	− 6. 3
22	11 3 56	13 41 34. 32	−18 0 2. 4	−1 24. 96	+7 12. 2	t25, 5	8. 868*n*	0. 865	+1. 14	− 7. 4
23	10 57 42	13 40 48. 22	−17 55 1. 0	−1 40. 79	−3 36. 3	t25, 5	8. 887*n*	0. 864	+1. 14	− 7. 5
26	12 6 38	13 38 28. 67	−17 39 20. 8	−1 43. 09	−1 13. 7	t25, 5	8. 984	0. 862	+1. 17	− 7. 9
1910										
July 24	12 8 54	19 29 28. 51	−18 30 16. 2	−2 24. 11	−4 23. 8	t25, 5	8. 997	0. 866	+2. 52	+ 1. 0
25	10 42 39	19 28 42. 15	−18 30 31. 8	−3 10. 47	−4 39. 4	t25, 5	8. 855*n*	0. 867	+2. 52	+ 1. 0
(246) ASPORINA										
1912										
May 24	12 57 16	14 35 5. 19	+ 8 26 25. 8	+0 34. 91	+8 59. 3	t30, 10	9. 454	0. 667	+2. 07	−11. 7
June 3	11 26 30	14 30 23. 62	+ 8 23 34. 9	−0 53. 56	−0 17. 5	t30, 10	9. 311	0. 657	+2. 06	−10. 4
(288) GLAUKE										
1909										
June 15	12 7 53	17 29 9. 15	−18 41 2. 0	+0 10. 26	+1 52. 7	t25, 5	8. 472	0. 869	+1. 84	− 3. 0
21	11 3 57	17 23 44. 10	−18 48 46. 4	+2 0. 48	+6 5. 7	t25, 5	8. 645*n*	0. 870	+1. 93	− 3. 3
24	11 58 43	17 21 6. 74	−18 53 9. 5	+1 33. 12	−6 35. 2	t25, 5	8. 906	0. 869	+1. 94	− 3. 5
29	11 29 55	17 17 6. 18	−19 1 1. 1	−0 4. 85	−0 5. 4	t30, 6	8. 958	0. 869	+1. 95	− 3. 4
July 6	10 28 23	17 12 18. 95	−19 13 18. 2	+1 17. 01	+4 59. 2	t25, 5	8. 468	0. 872	+1. 99	− 3. 8
1916										
Nov. 27	16 33 17	6 23 32. 35	+19 43 36. 0	−3 38. 51	−3 10. 5	t39, 8	9. 489	0. 530	+5. 54	0. 0
Dec. 1	14 12 11	6 20 48. 04	+19 46 9. 6	+2 25. 04	+3 30. 7	t25, 5	8. 864	0. 460	+5. 66	+ 1. 2
22	11 27 1	6 1 46. 42	+20 6 28. 7	+1 18. 88	−1 50. 2	t20, 4	8. 791*n*	0. 451	+6. 05	+ 2. 6
28	10 46 6	5 55 45. 19	+20 13 37. 4	−3 16. 82	+5 5. 9	t34, 7	8. 933*n*	0. 451	+6. 15	+ 2. 8
1918										
May 1	12 14 32	15 55 32. 85	−12 58 35. 7	−4 31. 65	+0 57. 9	t30, 6	9. 110*n*	0. 835	+3. 47	−10. 6
2	13 55 7	15 54 46. 87	−12 56 0. 3	+0 20. 27	+0 18. 5	d13, 10	8. 930	0. 837	+3. 50	−11. 1
17	12 34 41	15 42 33. 01	−12 24 20. 4	−0 48. 02	+4 36. 9	t40, 8	8. 821	0. 834	+3. 69	−11. 6
June 4	12 34 15	15 28 18. 32	−12 10 42. 1	−2 54. 16	−4 30. 3	t30, 6	9. 360	0. 822	+3. 77	−11. 8
5	12 9 18	15 27 40. 02	−12 11 1. 6	−3 32. 47	−4 49. 9	t29, 6	9. 283	0. 826	+3. 78	−11. 7

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
(203) POMPEJA							
h m s	° ′ ″			in.			
7 12 14. 17	+26 29 52. 5	AG Cambridge 3873	--	26	---	Fn.	
7 11 35. 23	+26 31 37. 8	AG Cambridge 3866	--	26	---	Fn.	
(221) EOS							
13 49 33. 49	+ 3 36 13. 6	AG Albany 4816	3	26	---	Fn.	
13 49 32. 35	+ 3 44 48. 6	AG Albany 4815	3	26	---	Fn.	
13 48 8. 31	+ 4 4 58. 8	AG Albany 4808	2	26	---	Fn.	
(229) ADELINDA							
2 46 45. 49	+16 7 11. 1	AG Berlin A 771	--	26	---	Hd.	
2 38 39. 41	+16 0 35. 6	Comp. with AG Berlin A771	3–4	26	252	Hl.	
2 35 41. 02	+15 48 25. 1	AG Berlin A 721	--	26	173	Hl.	
2 28 28. 91	+15 10 48. 2	AG Berlin A 699; AG Leipzig I 742	--	26	173	Hd.	$12^m.0$.
2 23 52. 13	+15 11 22. 4	AG Leipzig I 722	--	26	173	Hd.	$12^m.0$.
2 24 49. 81	+14 58 9. 7	AG Leipzig I 725	4	26	---	Hd.	$12^m.0$.
2 18 14. 20	+14 59 32. 8	AG Leipzig I 689	--	26	---	Hd.	Hazy.
2 20 2. 88	+14 38 51. 8	Küstner 1013	2	26	---	Hd.	$12^m.2$.
(241) GERMANIA							
13 50 6. 34	−18 52 43. 9	AG Algiers 5872	3	26	---	Fn.	
13 51 28. 82	−18 47 12. 9	AG Algiers 5881	3	26	---	Fn.	
13 42 58. 14	−18 7 7. 2	AG Washington 5190	3	26	---	Fn.	
13 42 27. 87	−17 51 17. 2	AG Washington 5186	4	26	---	Fn.	
13 40 10. 59	−17 37 59. 2	AG Washington 5175	--	26	---	Fn.	
19 31 50. 10	−18 25 53. 4	Hedrick's Cat. of Zodiacal Stars 1305	--	26	---	Bn.	
19 31 50. 10	−18 25 53. 4	Hedrick's Cat. of Zodiacal Stars 1305	--	26	---	Bn.	
(246) ASPORINA							
14 34 28. 21	+ 8 17 38. 2	AG Leipzig II 6768	2	26	388	Ws.	V. ft. at times. Hazy.
14 31 15. 12	+ 8 24 2. 8	AG Leipzig II 6751	4	26	388	Ws.	Hazy.
(288) GLAUKE							
17 28 57. 05	−18 42 51. 7	AG Algiers 7195	--	26	---	Fn.	
17 21 41. 69	−18 54 48. 8	AG Algiers 7151	2	26	---	Fn.	
17 19 31. 68	−18 46 30. 8	AG Algiers 7131	--	26	---	Fn.	
17 17 9. 08	−19 0 52. 3	AG Algiers 7112	--	26	--	Fn.	Ft. Moonlight.
17 10 59. 95	−19 18 13. 6	AG Algiers 7059	3	26	---	Fn.	
6 27 5. 32	+19 46 46. 5	AG Berlin A 2205	3	26	183	Hl.	Haze at last.
6 18 17. 34	+19 42 37. 7	AG Berlin A 2108	4	26	183	Bn.	
6 0 21. 49	+20 8 16. 3	AG Berlin A 1889; AG Berlin B 2164	3	26	388	Bn.	
5 58 55. 86	+20 8 28. 7	PGC Boss 1507	3	26	183	Hl.	Star too bright. Settings in δ on it are poor. Wires flashing.
16 0 1. 03	−12 59 23. 0	AG Harvard 5567	3	26	183	Hl.	Illumination unsatisfactory.
15 54 23. 10	−12 56 7. 7	AG Harvard 5540	5	26	183	B.	Clds.
15 43 17. 34	−12 28 45. 7	AG Harvard 5491	2	26	183	B.	Illumination very poor. Poor obsn.
15 31 8. 71	−12 6 0. 0	AG Harvard 5441	3	26	183	B.	Poor obsn.
15 31 8. 71	−12 6 0. 0	AG Harvard 5441	--	26	183	Hl.	Ft. Haze. Poor obsn.

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
(323) BRUCIA										
1924	h m s	h m s	° ′ ″	m s	′ ″				s	″
Aug. 14	15 34 23	4 13 59. 44	− 6 48 4. 0	−0 15. 53	− 6 22. 6	d10, 8	9. 523*n*	0. 780	+0. 95	+ 6. 0
15	14 45 33	4 16 4. 81	− 6 46 21. 4	+0 15. 44	− 2 27. 3	d10, 9	9. 592*n*	0. 770	+0. 96	+ 6. 1
15	15 6 52	4 16 6. 71	− 6 46 19. 7	+0 10. 99	+ 3 13. 2	d10, 8	9. 565*n*	0. 775	+0. 96	+ 6. 2
15	15 29 9	4 16 8. 62	− 6 46 18. 7	−0 8. 44	− 3 49. 1	d10, 8	9. 530*n*	0. 779	+0. 96	+ 6. 1
Dec. 10	10 21 48	5 14 6. 14	+ 5 1 13. 9	−0 28. 61	+ 4 50. 8	d12, 8	9. 262*n*	0. 693	+3. 58	− 2. 8
10	10 39 26	5 14 5. 06	+ 5 1 27. 8	−0 24. 05	− 2 44. 0	d10, 8	9. 176*n*	0. 691	+3. 58	− 2. 8
10	11 8 53	5 14 3. 33	+ 5 1 55. 2	+0 9. 27	− 9 12. 4	d10, 8	8. 968*n*	0. 689	+3. 58	− 2. 8
(329) SVEA										
1908										
May 26	12 9 20	16 6 5. 12	+ 3 51 7. 9	−1 34. 58	+ 1 2. 9	t25, 5	8. 616	0. 701	+1. 47	− 2. 5
28	11 40 6	16 4 22. 95	+ 3 59 55. 6	−0 42. 82	− 3 47. 4	t25, 5	7. 286	0. 700	+1. 48	− 2. 2
(349) DEMBOWSKA										
1914										
Mar. 18	10 20 44	10 55 15. 75	+16 33 1. 2	+1 11. 23	− 1 30. 6	t30, 6	9. 024*n*	0. 527	+2. 42	− 9. 8
23	8 44 29	10 51 31. 97	+16 41 17. 0	+2 6. 64	+ 0 34. 4	t30, 6	9. 391*n*	0. 554	+2. 43	− 9. 2
(354) ELEONORA										
1908										
June 2	13 3 9	15 52 13. 60	+ 7 53 5. 6	+1 8. 04	+ 6 24. 7	t25, 5	9. 350	0. 665	+1. 50	− 1. 2
6	12 31 44	15 49 15. 60	+ 7 43 6. 7	+1 48. 61	+12 9. 6	t25, 5	9. 303	0. 665	+1. 51	− 0. 8
(387) AQUITANIA										
1908										
Apr. 19	12 23 27	11 44 21. 31	+24 30 44. 5	+2 23. 73	+ 1 24. 6	t25, 5	9. 487	0. 440	+0. 91	− 0. 6
20	11 35 18	11 43 53. 33	+24 31 42. 1	+4 44. 65	− 3 50. 6	t20, 4	9. 354	0. 391	+0. 90	− 0. 4
20	12 26 29	11 43 52. 27	+24 31 42. 4	+4 51. 38	+ 0 26. 8	t25, 5	9. 505	0. 448	+0. 90	− 0. 4
20	12 26 29	11 43 52. 14	+24 31 43. 1	+3 57. 19	− 2 56. 8	t25, 5	9. 505	0. 448	+0. 90	− 0. 4
(402) CHLOË										
1908										
June 8	10 57 57	17 50 16. 23	− 9 51 39. 4	+0 11. 84	− 1 21. 3	d9, 8	9. 308*n*	0. 811	+1. 65	0. 0
11	12 8 14	17 47 25. 72	− 9 57 46. 6	+0 27. 69	− 0 30. 6	t29, 6	8. 577*n*	0. 819	+1. 69	+ 0. 3
12	11 35 32	17 46 30. 44	− 9 59 58. 4	−0 27. 61	− 2 42. 5	t30, 6	8. 972*n*	0. 818	+1. 71	+ 0. 4
18	10 59 14	17 40 49. 88	−10 15 43. 9	−2 45. 62	− 1 18. 3	t25, 5	9. 032*n*	0. 819	+1. 79	+ 0. 6
20	11 58 54	17 38 53. 91	−10 22 4. 1	−1 53. 43	− 3 5. 4	t25, 5	8. 510	0. 822	+1. 81	+ 0. 6
23	11 22 45	17 36 7. 02	−10 32 0. 2	+0 57. 65	+ 3 13. 6	t25, 5	8. 059*n*	0. 823	+1. 83	+ 0. 7
28	10 32 56	17 31 37. 98	−10 50 41. 3	−1 27. 12	+ 1 34. 6	t25, 5	8. 803*n*	0. 825	+1. 87	+ 1. 0
(415) PALATIA										
1913										
Oct. 4	11 40 23	0 58 10. 81	− 8 29 30. 3	−1 42. 88	+ 8 59. 1	t30, 6	8. 698*n*	0. 809	+3. 74	+25. 7
Nov. 7	9 30 21	0 37 32. 49	−10 33 29. 2	+0 58. 76	− 7 36. 3	t30, 6	6. 960*n*	0. 823	+3. 82	+22. 3

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
(323) BRUCIA							
h m s	° ′ ″			in.			
4 14 14. 02	− 6 41 47. 4	Ast Fer −6°0416, 20	3	26	183	B.	12½^{m}.
4 15 48. 41	− 6 44 0. 2	Ast Fer −6°0416, 55	3	26	183	B.	
4 15 54. 76	− 6 49 39. 1	Ast Fer −6°0416, 59	3	26	183	B.	
4 16 16. 10	− 6 42 35. 7	Ast Fer −6°0416, 71	3	26	183	B.	
5 14 31. 16	+ 4 56 26. 0	Ast Tou +5°0516, 116	4	26	183	B.	11^{m}. Vis. in 5-inch. Cent. p. m. +1^{s}.026, −5″.43 derived from several catalogs and applied.
5 14 25. 53	+ 5 4 14. 6	Ast Tou +5°0516, 12	5	26	183	B.	
5 13 50. 48	+ 5 11 10. 4	Ast Tou +5°0516, 7	4	26	183	B.	
(329) SVEA							
16 7 38. 23	+ 3 50 7. 5	AG Albany 5377	--	26	---	Fn.	
16 5 4. 29	+ 4 3 45. 2	AG Albany 5369	--	26	---	Fn.	
(349) DEMBOWSKA							
10 54 2. 10	+16 34 41. 6	AG Berlin A 4317	4	26	183	Ws.	Bright field.
10 49 22. 90	+16 40 51. 8	AG Berlin A 4293	3	26	183	Ws.	Bright field.
(354) ELEONORA							
15 51 4. 06	+ 7 46 42. 1	AG Leipzig II 7128	2	12	---	Fn.	
15 47 25. 48	+ 7 30 57. 9	AG Leipzig II 7101	3	12	---	Fn.	
(387) AQUITANIA							
11 41 56. 67	+24 29 20. 5	AG Berlin B 4357	3	12	---	Fn.	
11 39 7. 78	+24 35 33. 1	AG Berlin B 4346	2	12	---	Fn.	
11 38 59. 99	+24 31 16. 0	AG Berlin B 4345	1	12	---	Fn.	
11 39 54. 05	+24 34 40. 3	AG Berlin B 4350	1	12	---	Fn.	
(402) CHLOË							
17 50 2. 74	− 9 50 18. 1	AG Wien-Ottakring 6028	4	26	---	Hd.	Fuzzy. Brt. moonlight.
17 46 56. 34	− 9 57 16. 3	AG Wien-Ottakring 6014	3	26	---	Fn.	Brt. moonlight.
17 46 56. 34	− 9 57 16. 3	AG Wien-Ottakring 6014	3	26	---	Fn.	Brt. moonlight.
17 43 33. 71	−10 14 26. 2	AG Harvard 6077	2	26	---	Fn.	
17 40 45. 53	−10 18 59. 3	AG Harvard 6069	4	26	---	Fn.	11^{m}.0. Sky thick.
17 35 7. 54	−10 35 14. 5	AG Harvard 6042	2	26	---	Fn.	11^{m}.0.
17 33 3. 23	−10 52 16. 9	AG Harvard 6023	2	26	---	Fn.	11^{m}.5.
(415) PALATIA							
0 59 49. 95	− 8 38 55. 1	AG Wien-Ottakring 215	4	26	183	Ws.	10^{m}.
0 36 29. 91	−10 26 15. 2	AG Harvard 128	2	26	183	Ws.	Haze.

(433) EROS

Date	W. M. T.	Apparent Place of Asteroid		Asteroid—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
1912	h m s	h m s	° ′ ″	m s	′ ″				s	″
July 8	14 57 49	20 54 30. 41	−20 17 23. 7	−1 25. 61	− 1 47. 7	t25, 5	9. 171	0. 870	+2. 88	+ 5. 6
12	14 54 22	20 48 2. 32	−20 7 45. 2	−1 5. 08	− 0 30. 8	t25, 5	9. 269	0. 866	+3. 00	+ 5. 4
13	14 20 25	20 46 22. 16	−20 5 21. 4	−2 15. 31	+ 0 31. 0	t25, 5	9. 109	0. 871	+3. 03	+ 5. 4
26	12 45 55	20 22 9. 91	−19 28 34. 7	+0 48. 67	− 2 14. 5	t30, 10	8. 946	0. 871	+3. 25	+ 3. 6
Aug. 3	11 31 35	20 7 6. 53	−18 59 46. 5	+3 55. 16	+ 3 44. 2	t15, 3	8. 470	0. 871	+3. 28	+ 1. 9
5	11 1 31	20 3 33. 09	−18 53 32. 9	+2 32. 13	+ 3 46. 2	t25, 5	7. 998n	0. 870	+3. 28	+ 1. 8
6	11 40 28	20 1 44. 91	−18 47 41. 8	+0 43. 95	+ 9 37. 2	t30, 6	8. 924	0. 868	+3. 28	+ 1. 9
1914										
Aug. 19	14 37 1	0 20 3. 99	+19 4 57. 8	−3 7. 32	+ 0 7. 4	t14, 4	8. 236	0. 471	+3. 29	+18. 9
31	14 45 15	0 10 44. 54	+21 50 7. 5	+1 24. 56	+ 4 46. 4	t20, 4	9. 188	0. 429	+3. 55	+20. 8
Sept. 4	12 22 48	0 6 3. 64	+22 35 27. 1	−4 40. 67	+ 0 16. 3	t20, 4	9. 024n	0. 398	+3. 60	+21. 4
9	12 13 1	23 58 55. 16	+23 24 59. 2	+0 51. 63	− 0 12. 2	t20, 5	8. 845n	0. 371	+3. 64	+22. 1
20	13 11 2	23 39 24. 87	+24 30 40. 5	−4 51. 03	− 5 44. 7	t20, 4	9. 278	0. 374	+3. 72	+24. 2
29	12 12 43	23 21 53. 13	+24 31 54. 7	+1 51. 38	− 0 52. 5	t20, 5	9. 252	0. 370	+3. 70	+25. 7
Oct. 20	9 55 36	22 49 33. 07	+22 4 30. 8	−4 39. 97	− 0 16. 2	t20, 4	9. 113	0. 416	+3. 46	+27. 3
23	12 21 33	22 46 51. 19	+21 33 19. 8	+2 43. 42	+ 0 14. 6	t20, 5	9. 607	0. 566	+3. 39	+27. 2
28	11 59 12	22 43 54. 64	+20 43 5. 1	−3 26. 21	− 7 11. 9	t30, 6	9. 605	0. 576	+3. 37	+27. 5
Nov. 10	12 15 58	22 44 2. 65	+18 45 8. 8	+2 12. 96	− 3 7. 0	t25, 5	9. 663	0. 658	+3. 20	+27. 2
18	10 24 14	22 49 13. 95	+17 50 40. 1	−5 12. 79	− 5 33. 4	t10, 2	9. 572	0. 593	+3. 21	+27. 6
19	11 52 46	22 50 11. 43	+17 44 37. 9	−1 12. 11	− 0 3. 6	t30, 6	9. 664	0. 668	+3. 18	+27. 4
Dec. 14	7 49 12	23 27 36. 18	+16 48 43. 8	−0 31. 58	− 7 30. 7	t30, 10	9. 354	0. 546	+3. 17	+28. 0
1915										
Jan. 4	8 9 1	0 17 6. 03	+17 48 19. 4	−0 40. 97	+ 1 54. 0	t25, 5	9. 503	0. 564	+0. 26	+ 8. 9
9	7 46 18	0 30 46. 69	+18 11 40. 1	+0 51. 89	− 3 59. 0	t25, 5	9. 465	0. 547	+0. 25	+ 8. 9
13	7 26 8	0 42 12. 70	+18 31 57. 4	−0 52. 64	+ 5 34. 3	t25, 5	9. 424	0. 531	+0. 31	+ 9. 2
Feb. 9	7 45 30	2 10 16. 35	+20 52 21. 3	+2 13. 90	+ 3 27. 6	t25, 5	9. 522	0. 570	+0. 52	+10. 3
27	8 10 28	3 17 35. 64	+21 43 0. 5	−2 2. 91	− 1 34. 2	t30, 6	9. 576	0. 541	+0. 75	+10. 6
Mar. 3	8 59 8	3 33 20. 31	+21 44 55. 7	−6 40. 43	− 1 14. 3	t25, 5	9. 639	0. 594	+0. 81	+10. 5
17	8 6 58	4 28 59. 85	+21 18 16. 3	−1 53. 93	+ 0 30. 3	t30, 6	9. 569	0. 543	+0. 93	+ 9. 5
26	9 34 59	5 5 33. 51	+20 31 12. 1	+1 31. 49	+ 6 39. 7	t29, 6	9. 664	0. 639	+1. 02	+ 8. 4
Apr. 8	9 7 33	5 57 32. 15	+18 42 48. 3	−1 50. 94	+ 0 49. 8	t25, 5	9. 636	0. 627	+1. 17	+ 6. 3
17	9 23 17	6 32 53. 93	+17 1 35. 2	+2 3. 64	− 5 16. 5	t30, 6	9. 646	0. 653	+1. 18	+ 4. 6
1919										
July 25	13 4 8	19 31 36. 11	−24 38 46. 6	+1 38. 66	+ 1 17. 7	t25, 5	9. 344	0. 879	+4. 64	+14. 1
29	10 34 26	19 24 35. 11	−24 14 18. 0	−1 46. 64	+ 1 19. 4	t25, 5	8. 705n	0. 893	+4. 65	+13. 6
Aug. 2	11 57 27	19 17 53. 23	−23 47 14. 3	+0 3. 01	− 3 22. 1	d8, 8	9. 246	0. 882	+4. 62	+12. 7
1923										
Oct. 13	14 25 51	7 33 42. 63	+38 37 32. 4	+0 5. 25	+ 7 22. 2	d10, 8	9. 681n	0. 267	+2. 36	−18. 5
16	15 24 17	7 46 30. 78	+38 12 39. 4	−0 54. 91	+12 58. 1	d10, 8	9. 579n	0. 045	+2. 35	−19. 1
Nov. 2	14 22 28	8 56 16. 38	+34 12 46. 2	+0 48. 04	− 0 53. 9	d10, 9	9. 666n	0. 388	+2. 23	−21. 4
9	14 38 12	9 23 34. 38	+31 42 38. 5	−0 13. 80	− 0 23. 5	d10, 8	9. 632n	0. 399	+2. 17	−21. 9
14	14 2 45	9 42 11. 69	+29 39 10. 1	−0 20. 49	− 7 6. 6	d10, 8	9. 665n	0. 500	+2. 19	−22. 2
Dec. 14	15 15 55	11 19 50. 16	+12 45 52. 1	−0 21. 90	− 6 54. 2	d10, 8	9. 460	0. 620	+2. 45	−20. 9
1924										
Jan. 14	14 30 56	12 34 11. 65	− 9 42 52. 5	+4 41. 41	+ 2 11. 4	t29, 6	9. 449n	0. 802	+0. 15	+ 3. 1
18	14 42 52	12 41 48. 43	−12 42 41. 6	+1 50. 38	+ 0 46. 8	t30, 6	9. 398n	0. 822	+0. 24	+ 3. 7
26	15 58 34	12 55 31. 29	−18 38 33. 0	−3 29. 42	+ 1 28. 4	t30, 6	8. 870n	0. 868	+0. 45	+ 4. 8
Feb. 6	15 45 39	13 10 6. 33	−26 21 29. 6	+2 52. 46	− 6 41. 2	t25, 5	8. 639n	0. 901	+0. 85	+ 5. 2
8	15 21 15	13 12 7. 88	−27 40 53. 8	−0 10. 24	− 1 10. 6	d10, 8	8. 933n	0. 904	+0. 89	+ 5. 5

(433) EROS

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
20 55 53. 14	−20 15 41. 6	AG Algiers 9011	2	26	183	Bn.	
20 49 4. 40	−20 7 19. 8	AG Algiers 8959; comp. with AG Alg. 8957	2	26	183	Bn.	
20 48 34. 44	−20 5 57. 8	AG Algiers 8957	3	26	183	Bn.	
20 21 17. 99	−19 26 23. 8	AG Algiers 8761	3–4	26	388	Ws.	V. ft. Haze. Bright moonlight.
20 3 8. 09	−19 3 32. 6	PGC Boss 5155	3	26	183	Ws.	Stopped to observe occultation.
20 0 57. 68	−18 57 20. 9	AG Algiers 8605	2	26	183	Ws.	Hazy at times.
20 0 57. 68	−18 57 20. 9	AG Algiers 8605	2	26	183	Ws.	Haze.
0 23 8. 02	+19 4 31. 5	AG Berlin A 104	2	26	183	Bn.	Brt. field.
0 9 16. 43	+21 45 0. 3	AG Berlin B 35	2	26	183	Bn.	Brt. field.
0 10 40. 71	+22 34 49. 4	AG Berlin B 45	3	26	183	Bn.	Brt. field.
23 57 59. 89	+23 24 49. 3	AG Berlin B 9191	3	26	183	Bn.	Brt. field.
23 44 12. 18	+24 36 1. 0	AG Berlin B 9096	3	26	183	Bn.	Brt. field.
23 19 58. 05	+24 32 21. 5	AG Berlin B 8958	3	26	183	Bn.	Brt. field.
22 54 9. 58	+22 4 19. 7	AG Berlin B 8802	3	26	178	Bn.	Star v. ft. at last. Haze. Brt. field and red wires.
22 44 4. 38	+21 32 38. 0	AG Berlin B 8756	2	26	178	Bn.	Brt. field.
22 47 17. 48	+20 49 49. 5	AG Berlin B 8771	3	26	183	Bn.	Moonlight. Haze. Clds.
22 41 46. 49	+18 47 48. 6	AG Berlin A 9313	4	26	183	Bn.	Clds. at first.
22 54 23. 53	+17 55 45. 9	AG Berlin A 9392	3	26	183	Bn.	Stopped by clds.
22 51 20. 36	+17 44 14. 1	AG Berlin A 9370	3	26	183	Bn.	
23 28 4. 59	+16 55 46. 5	AG Berlin A 9605	3	26	388	Bn.	
0 17 46. 74	+17 46 16. 5	AG Berlin A 75	2	26	183	Bn.	
0 29 54. 55	+18 15 30. 2	AG Berlin A 158	2	26	183	Bn.	
0 43 5. 03	+18 26 13. 9	AG Berlin A 211	3	26	183	Bn.	
2 8 1. 93	+20 48 43. 4	AG Berlin B 661	3	26	183	Bn.	Clds.
3 19 37. 80	+21 44 24. 1	AG Berlin B 1009	3	26	183	Bn.	
3 39 59. 93	+21 45 59. 5	AG Berlin B 1124	3	26	183	Bn.	
4 30 52. 85	+21 17 36. 5	AG Berlin B 1469	3	26	183	Bn.	
5 4 1. 00	+20 24 24. 0	AG Berlin B 1651	3	26	183	Bn.	V. ft. Moonlight.
5 59 21. 92	+18 41 52. 2	AG Berlin A 1880	2	26	183	Bn.	
6 30 49. 11	+17 6 47. 1	AG Berlin A 2250	2	26	183	Bn.	
19 29 52. 81	−24 40 18. 4	Cordoba A 13627	4	26	388	Bn.	12½^{m}.
19 26 17. 10	−24 15 51. 0	Cordoba A 13590	4	26	183	Bn.	Interrupted by clds. Poor obsn.
19 17 45. 60	−23 44 4. 9	Cordoba A 13486	5	26	388	Bn.	
7 33 35. 02	+38 30 28. 7	AG Lund 3931	2	26	183	Hl.	
{ 7 47 23. 34	+38 8 20. 4	Comp. with AG Lund 4003 }	2	26	183	Hl.	{Used α of 1st star; δ of 2d star.
{ 7 46 37. 69	+38 0 0. 4	AG Lund 4003 }					
8 55 26. 11	+34 14 1. 5	AG Leiden 3724	2	26	183	B.	Used step star.
9 23 46. 01	+31 43 23. 9	AG Leiden 3876	3	26	183	B.	
9 42 29. 99	+29 46 38. 9	Ast Oxf +29°0940, 28063; +30°0945, 23882.	3	26	183	B.	
11 20 9. 61	+12 53 7. 2	Ast Bor +14°1120, 53	4	26	183	B.	Poor obsn.
12 29 30. 09	− 9 45 7. 0	AG Wien-Ottakring 4589	2	26	183	B.	
12 39 57. 81	−12 43 32. 1	AG Harvard 4602	4	26	183	B.	
12 59 0. 26	−18 40 6. 2	Ast Hyd −18°1256, 36165; −19°1300, 38839.	5	26	183	B.	Poor obsn.
13 7 13. 02	−26 14 53. 6	Cordoba A 9781	4	26	183	B.	
13 12 17. 23	−27 39 48. 7	Cordoba B 8439	4	26	183	B.	

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
(447) VALENTINE										
1918	h m s	h m s	° ′ ″	m s	′ ″				s	″
May 8	13 12 22	16 10 2. 78	−19 22 10. 5	+2 23. 64	+ 0 2. 1	t30, 10	8. 191	0. 873	+3. 70	− 9. 4
14	12 17 27	16 5 14. 08	−19 16 5. 4	−2 47. 66	+ 1 35. 1	t30, 10	8. 609n	0. 872	+3. 82	− 9. 4
16	11 28 56	16 3 34. 65	−19 13 55. 6	−1 4. 12	+ 0 40. 1	t30, 10	9. 086n	0. 868	+3. 85	− 9. 8
31	12 8 14	15 50 42. 52	−18 56 18. 1	+2 13. 93	− 2 19. 1	t25, 5	9. 045	0. 867	+3. 97	−11. 2
June 4	10 9 39	15 47 30. 40	−18 51 56. 4	−0 58. 19	+ 2 2. 5	t25, 5	8. 992n	0. 868	+3. 97	−11. 1
8	11 1 44	15 44 22. 24	−18 47 50. 1	+3 37. 63	+ 3 21. 2	t25, 5	8. 708	0. 869	+3. 98	−11. 7
12	9 46 3	15 41 31. 01	−18 44 19. 9	+0 46. 37	+ 6 51. 5	t25, 5	8. 841n	0. 868	+4. 01	−11. 8
(451) PATIENTIA										
1912										
Apr. 10	11 23 15	12 36 43. 98	+19 29 53. 1	−0 18. 92	− 3 30. 6	t18, 6	7. 743	0. 462	+1. 94	− 9. 9
11	12 31 32	12 35 57. 31	+19 31 16. 6	−1 5. 59	− 2 7. 2	t30, 6	9. 197	0. 479	+1. 94	− 9. 8
(454) MATHESIS										
1908										
Feb. 2	11 6 57	8 12 23. 80	+30 21 1. 2	+2 16. 63	+10 42. 7	t25, 5	8. 609n	0. 111	+0. 64	− 2. 8
(465) ALEKTO										
1908										
June 27	14 31 59	20 39 33. 87	−19 17 25. 8	−0 43. 39	+ 5 43. 6	t30, 6	8. 540	0. 872	+1. 70	+ 7. 6
July 1	14 14 3	20 37 4. 23	−19 20 49. 5	+0 33. 68	+ 2 9. 9	t25, 5	8. 548	0. 872	+1. 82	+ 7. 8
30	12 29 2	20 13 20. 36	−19 56 9. 2	−1 50. 98	− 0 7. 6	t25, 5	9. 018	0. 872	+2. 31	+ 7. 8
Aug. 1	12 29 35	20 11 39. 09	−19 58 17. 1	−1 39. 01	+ 0 31. 0	t25, 5	9. 097	0. 871	+2. 31	+ 7. 7
1	12 44 45	20 11 38. 55	−19 58 16. 8	−0 51. 52	+ 5 50. 5	t25, 5	9. 193	0. 868	+2. 31	+ 7. 6
3	11 7 12	20 10 2. 86	−20 0 12. 0	+2 33. 47	+ 2 2. 3	t25, 5	8. 458n	0. 876	+2. 31	+ 7. 2
3	11 40 22	20 10 1. 80	−20 0 13. 1	+1 56. 82	+ 9 31. 3	t25, 5	8. 622	0. 875	+2. 31	+ 7. 4
(480) HANSA										
1911										
Nov. 21	8 10 27	2 30 33. 30	+20 40 22. 1	+1 31. 90	− 5 37. 1	t25, 5	9. 449n	0. 500	+3. 51	+22. 6
22	8 16 6	2 29 50. 02	+20 27 0. 0	−1 23. 75	− 3 15. 2	t25, 5	9. 419n	0. 496	+3. 53	+22. 5
(491) CARINA										
1912										
June 12	12 26 24	16 42 20. 79	+ 3 46 18. 2	+3 39. 05	+ 9 16. 6	t30, 10	9. 131	0. 704	+2. 33	−10. 8
17	12 1 56	16 38 55. 85	+ 3 47 7. 1	+2 20. 41	− 1 1. 5	t24, 8	9. 123	0. 704	+2. 39	−10. 2
20	12 50 4	16 36 57. 17	+ 3 45 27. 7	+2 3. 55	− 6 58. 0	t30, 10	9. 389	0. 708	+2. 40	−10. 0
(492) GISMONDA										
1913										
Oct. 5	13 9 23	0 5 37. 88	− 1 19 44. 6	+0 48. 57	− 5 54. 9	t30, 10	9. 362	0. 751	+3. 67	+23. 9

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
(447) VALENTINE							
h m s	° ′ ″			in.			
16 7 35. 44	−19 22 3. 2	AG Algiers 6698	4	26	367	Bn.	
16 7 57. 92	−19 17 31. 1	AG Algiers 6700	3	26	367	Bn.	
16 4 34. 92	−19 14 25. 9	AG Algiers 6675	2	26	367	Bn.	
15 48 24. 62	−18 53 47. 8	AG Algiers 6560	3	26	183	Bn.	Haze.
15 48 24. 62	−18 53 47. 8	AG Algiers 6560	3	26	183	Bn.	
15 40 40. 63	−18 50 59. 6	AG Algiers 6513	3	26	183	Bn.	
15 40 40. 63	−18 50 59. 6	AG Algiers 6513	5	26	183	Bn.	Windy.
(451) PATIENTIA							
12 37 0. 96	+19 33 33. 6	AG Berlin A 4727	2	12	235	Ws.	
12 37 0. 96	+19 33 33. 6	AG Berlin A 4727	2	26	183	Ws.	Brt. field.
(454) MATHESIS							
8 10 6. 53	+30 10 21. 3	AG Leiden 3460	--	26	---	Fn.	
(465) ALEKTO							
20 40 15. 56	−19 23 17. 0	AG Algiers 8901	3	26	---	Fn.	$12^m.8$.
20 36 28. 73	−19 23 7. 2	AG Algiers 8870	1	26	---	Fn.	$12^m.7$.
20 15 9. 03	−19 56 9. 4	AG Algiers 8713	2	26	---	Fn.	$12^m.6$.
20 13 15. 79	−19 58 55. 8	AG Algiers 8694	4	26	---	Fn.	$12^m.6$.
20 12 27. 76	−20 4 14. 9	AG Algiers 8687	4	26	---	Fn.	
20 7 27. 08	−20 2 21. 5	AG Algiers 8652	2	26	---	Fn.	
20 8 2. 67	−20 9 51. 8	AG Algiers 8657	--	26	---	Fn.	Used n. f. component of star.
(480) HANSA							
2 28 57. 89	+20 45 36. 6	AG Berlin B 774	--	12	---	Ep.	
2 31 10. 24	+20 29 52. 7	AG Berlin B 784	--	12	---	Ep.	
(491) CARINA							
16 38 39. 41	+ 3 37 12. 4	AG Albany 5533	3	26	388	Bn.	
16 36 33. 05	+ 3 48 18. 8	AG Albany 5518	3	26	388	Bn.	V. ft. last transit. Hazed over.
16 34 51. 22	+ 3 52 35. 7	AG Albany 5510	3	26	388	Bn.	
(492) GISMONDA							
0 4 45. 64	− 1 14 13. 6	AG Nicolajew 13	2	26	388	Ws.	$12^m.5$.

(495) EULALIA

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1908	h m s	h m s	° ′ ″	m s	′ ″				s	″
Mar. 25	10 12 45	12 27 4. 14	− 2 15 40. 7	+3 20. 44	−0 32. 1	t20, 4	9. 364n	0. 758	+0. 92	− 5. 8
27	13 21 47	12 25 21. 86	− 2 0 48. 3	+0 54. 38	−5 27. 8	t25, 5	9. 181	0. 758	+0. 93	− 6. 0
Apr. 2	13 49 32	12 20 37. 34	− 1 19 24. 9	−1 9. 16	+3 20. 0	t9, 2	9. 401	0. 750	+0. 95	− 6. 0
4	11 23 11	12 19 10. 53	− 1 6 45. 0	+1 39. 07	−9 42. 2	t24, 5	7. 868n	0. 750	+0. 95	− 6. 0

(506) MARION

Date	W. M. T.	α	δ	α	δ	Comp.	α	δ	α	δ
1908										
Feb. 8	10 50 46	8 31 52. 05	+20 31 33. 0	−1 13. 34	−0 9. 1	t20, 4	8. 799n	0. 442	+0. 64	− 3. 6
20	8 44 28	8 21 19. 01	+19 45 11. 8	+0 10. 54	−4 25. 7	t24, 5	9. 306n	0. 487	+0. 62	− 3. 2
20	8 59 12	8 21 18. 27	+19 45 8. 6	−0 39. 55	+9 10. 1	t25, 5	9. 239n	0. 479	+0. 62	− 3. 2

(507) LAODICA

Date	W. M. T.	α	δ	α	δ	Comp.	α	δ	α	δ
1908										
Jan. 9	9 52 57	6 14 23. 23	+27 30 32. 1	−1 45. 95	−2 29. 6	t24, 5	9. 181n	0. 267	+0. 37	− 2. 2

(532) HERCULINA

Date	W. M. T.	α	δ	α	δ	Comp.	α	δ	α	δ
1908										
Jan. 5	11 32 11	7 28 3. 55	+21 49 14. 1	−0 54. 03	−0 24. 5	t25, 5	9. 094n	0. 421	+0. 32	− 3. 2
9	11 41 12	7 24 5. 26	+22 25 3. 1	+0 58. 86	−0 59. 2	t25, 5	8. 804n	0. 396	+0. 38	− 3. 1
9	11 58 14	7 24 4. 59	+22 25 9. 2	+1 53. 13	+5 34. 5	t25, 5	8. 431n	0. 393	+0. 38	− 3. 1
9	12 18 25	7 24 3. 60	+22 25 17. 3	−1 48. 48	−3 33. 2	t25, 5	8. 223	0. 392	+0. 38	− 3. 2
15	9 16 40	7 18 7. 07	+23 17 33. 5	+1 7. 85	−0 13. 6	t25, 5	9. 468n	0. 457	+0. 44	− 3. 2
15	9 35 13	7 18 6. 35	+23 17 40. 4	+0 42. 73	+0 27. 6	t25, 5	9. 416n	0. 438	+0. 44	− 3. 2

(534) NASSOVIA

Date	W. M. T.	α	δ	α	δ	Comp.	α	δ	α	δ
1908										
Feb. 24	7 36 54	8 26 52. 50	+22 21 39. 7	+1 46. 41	+0 19. 6	t25, 5	9. 493n	0. 485	+0. 61	− 2. 7
28	8 11 27	8 24 43. 38	+22 29 15. 6	+0 58. 50	−3 33. 6	t30, 6	9. 334n	0. 435	+0. 59	− 2. 5
Mar. 4	8 18 3	8 22 36. 40	+22 36 11. 3	+1 11. 17	−1 17. 1	t25, 5	9. 202n	0. 412	+0. 54	− 2. 0

(536) MERAPI

Date	W. M. T.	α	δ	α	δ	Comp.	α	δ	α	δ
1909										
Mar. 22	12 31 26	10 57 44. 89	+33 37 21. 9	−1 16. 79	−0 53. 2	t25, 5	9. 340	0. 040	+1. 15	− 0. 9
25	9 33 50	10 55 47. 15	+33 35 30. 5	+1 19. 48	+8 33. 0	t25, 5	9. 219	9. 984	+1. 12	− 0. 2
26	12 23 48	10 55 3. 28	+33 34 23. 3	−4 29. 94	+5 5. 4	t25, 5	9. 384	0. 072	+1. 13	− 0. 4

(537) PAULY

Date	W. M. T.	α	δ	α	δ	Comp.	α	δ	α	δ
1914										
Apr. 2	13 9 0	13 20 25. 46	+ 6 32 52. 2	+0 56. 22	−0 5. 0	t20, 4	8. 800	0. 671	+2. 35	−17. 6
3	11 48 18	13 19 43. 84	+ 6 38 33. 9	+1 54. 30	+1 24. 0	t30, 6	8. 951n	0. 670	+2. 37	−17. 6
6	12 13 32	13 17 28. 82	+ 6 56 17. 6	−4 46. 62	+4 19. 9	t25, 5	8. 034n	0. 666	+2. 40	−17. 7
13	12 58 57	13 12 7. 93	+ 7 33 46. 8	−2 18. 18	−4 10. 6	t30, 6	9. 160	0. 662	+2. 45	−16. 9
17	13 8 52	13 9 5. 53	+ 7 52 20. 6	+1 49. 69	+0 53. 6	t30, 6	9. 298	0. 662	+2. 49	−16. 5
21	11 22 27	13 6 11. 43	+ 8 8 8. 0	+3 20. 47	−4 36. 0	t25, 5	8. 445	0. 651	+2. 49	−16. 0

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
(495) EULALIA							
h m s	° ′ ″			in.			
12 23 42. 78	− 2 15 2. 8	AG Nicolajew 3421	--	26	---	Hd.	12m.8.
12 24 26. 55	− 1 55 14. 5	AG Nicolajew 3422	--	26	---	Hd.	12m.5.
12 21 45. 55	− 1 22 38. 9	AG Nicolajew 3413	--	26	---	Fn.	
12 17 30. 51	− 0 56 56. 8	AG Nicolajew 3401	--	26	---	Fn.	
(506) MARION							
8 33 4. 75	+20 31 45. 7	AG Berlin B 3457	--	26	---	Fn.	12m.0.
8 21 7. 85	+19 49 40. 7	AG Berlin A 3331	--	26	---	Fn.	Used s. f. component of star.
8 21 57. 20	+19 36 1. 7	AG Berlin A 3338	--	26	---	Fn.	
(507) LAODICA							
6 16 8. 81	+27 33 3. 9	AG Cambridge 3163	--	26	---	Fn.	
(532) HERCULINA							
7 28 57. 26	+21 49 41. 8	AG Berlin B 3015	2	12	---	Fn.	
7 23 6. 02	+22 26 5. 4	AG Berlin B 2961	4	12	---	Fn.	
7 22 11. 08	+22 19 37. 8	AG Berlin B 2952	2	12	---	Fn.	Used s. f. component of star.
7 25 51. 70	+22 28 53. 7	AG Berlin B 2988	2	12	---	Fn.	
7 16 58. 78	+23 17 50. 3	AG Berlin B 2914	3	12	---	Fn.	
7 17 23. 18	+23 17 16. 0	AG Berlin B 2916	3	12	---	Fn.	
(534) NASSOVIA							
8 25 5. 48	+22 21 22. 8	AG Berlin B 3402	--	26	---	Fn.	
8 23 44. 29	+22 32 51. 7	AG Berlin B 3395	--	26	---	Hd.	13m.0. Some transits poor, through haze.
8 21 24. 69	+22 37 30. 4	AG Berlin B 3385	--	26	---	Hd.	13m.2.
(536) MERAPI							
10 59 0. 53	+33 38 16. 0	AG Leiden 4348	3	26	---	Fn.	
10 54 26. 55	+33 26 57. 7	AG Leiden 4328	--	26	---	Fn.	
10 59 32. 09	+33 29 18. 3	AG Leiden 4351	--	26	---	Fn.	
(537) PAULY							
13 19 26. 89	+ 6 33 14. 8	AG Leipzig II 6393	4	26	183	Bn.	V. ft. last half. Haze. Stopped by clds.
13 17 47. 17	+ 6 37 27. 5	AG Leipzig II 6390	3	26	183	Bn.	Seems a trifle hazy. Moonlight.
13 22 13. 04	+ 6 52 15. 4	AG Leipzig II 6401	3	26	183	Bn.	Moonlight. V. faint.
13 14 23. 66	+ 7 38 14. 3	AG Leipzig II 6372	3	26	183	Bn.	
13 7 13. 35	+ 7 51 43. 5	AG Leipzig II 6341	2	26	183	Bn.	
13 2 48. 47	+ 8 13 0. 0	AG Leipzig II 6326	2	26	183	Bn.	A trifle hazy.

Date	W. M. T.	Apparent Place of Asteroid		Asteroid—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
(547) PRAXEDIS										
1908	h m s	h m s	° ′ ″	m s	′ ″				s	″
July 17	9 55 2	19 41 42. 63	+ 5 29 33. 9	−1 33. 50	− 3 47. 5	t24, 5	9. 376n	0. 691	+2. 00	+ 6. 0
17	9 55 2	19 41 42. 74	+ 5 29 34. 0	−2 43. 41	− 1 39. 0	t24, 5	9. 376n	0. 691	+2. 00	+ 6. 0
(554) PERAGA										
1909										
Mar. 17	11 31 15	11 16 42. 19	+ 0 10 49. 2	+1 26. 30	− 0 41. 3	t25, 5	8. 002n	0. 738	+0. 87	− 5. 4
20	10 46 10	11 13 57. 64	+ 0 27 25. 5	−0 55. 90	+ 8 37. 7	t25, 5	8. 850n	0. 736	+0. 87	− 5. 4
22	11 16 7	11 12 9. 75	+ 0 38 27. 7	−2 16. 26	− 0 7. 5	t25, 5	7. 906	0. 734	+0. 86	− 5. 4
1918										
Sept. 14	12 22 5	23 41 55. 26	+ 3 5 8. 0	−3 10. 36	+ 0 13. 2	t25, 5	8. 435	0. 710	+4. 46	+29. 0
15	10 16 47	23 41 4. 23	+ 3 0 51. 8	−1 12. 06	− 1 32. 1	t30, 6	9. 315n	0. 713	+4. 47	+29. 0
23	14 20 37	23 33 25. 58	+ 2 19 52. 8	+1 34. 87	+ 5 32. 0	t25, 5	9. 503	0. 725	+4. 49	+29. 5
27	13 31 5	23 29 49. 00	+ 1 58 53. 8	−1 58. 85	− 1 7. 1	t24, 5	9. 435	0. 724	+4. 52	+29. 8
Oct. 3	11 15 48	23 24 48. 09	+ 1 27 51. 0	+1 12. 19	+ 1 14. 6	t25, 5	8. 891	0. 726	+4. 52	+29. 8
3	11 15 48	23 24 48. 41	+ 1 27 53. 5	−1 24. 99	− 5 9. 9	t25, 5	8. 891	0. 726	+4. 50	+29. 8
7	8 30 58	23 21 51. 01	+ 1 6 17. 7	−0 50. 27	− 9 4. 3	t25, 5	9. 315n	0. 731	+4. 47	+29. 7
(569) MISA										
1910										
Dec. 8	11 56 3	5 15 21. 95	+24 43 54. 8	+1 20. 43	+10 27. 8	t30, 6	8. 386n	0. 328	+3. 94	+10. 0
20	10 41 27	5 3 35. 31	+24 21 48. 1	−1 51. 65	+ 4 7. 2	t25, 5	8. 767n	0. 342	+4. 08	+11. 0
21	8 41 36	5 2 44. 57	+24 19 54. 1	+1 13. 79	+ 3 34. 7	t25, 5	9. 465n	0. 433	+4. 07	+11. 4
(588) ACHILLES										
1919										
Apr. 26	10 59 0	11 20 26. 33	− 5 4 0. 5	−3 26. 88	+ 8 5. 6	t30, 6	9. 344	0. 779	+2. 76	−20. 5
May 2	11 38 34	11 19 13. 19	− 4 52 32. 9	+0 8. 17	+ 1 32. 5	d8, 8	9. 510	0. 770	+2. 69	−20. 4
3	10 25 45	11 19 4. 29	− 4 50 54. 0	−0 4. 68	+ 0 45. 0	d8, 8	9. 328	0. 778	+2. 69	−20. 4
3	11 39 27	11 19 3. 93	− 4 50 46. 5	−3 14. 98	+ 1 59. 7	t25, 5	9. 519	0. 769	+2. 71	−20. 4
(600) MUSA										
1909										
Jan. 26	9 7 50	7 23 12. 94	+15 40 52. 9	+0 16. 09	− 2 1. 0	t30, 6	9. 350n	0. 563	+0. 51	− 0. 7
26	9 22 57	7 23 12. 39	+15 40 54. 5	−2 38. 68	− 2 15. 9	t25, 5	9. 291n	0. 557	+0. 52	− 0. 7
28	7 31 24	7 21 35. 21	+15 51 56. 6	−0 37. 82	+ 1 20. 6	t24, 5	9. 561n	0. 611	+0. 51	− 0. 8
(611) VALERIA										
1908										
Feb. 4	9 38 45	8 43 32. 80	− 0 0 10. 5	+1 28. 63	+ 0 52. 4	t25, 5	9. 388n	0. 740	+0. 65	− 4. 4
19	9 21 37	8 32 56. 46	+ 1 50 19. 5	+1 8. 79	− 1 37. 6	t10, 2	9. 177n	0. 723	+0. 65	− 5. 8
20	10 37 15	8 32 18. 77	+ 1 58 46. 6	+1 51. 11	− 0 26. 3	t25, 5	7. 862	0. 721	+0. 64	− 5. 8
20	10 37 15	8 32 18. 85	+ 1 58 47. 3	−0 44. 38	− 0 0. 2	t25, 5	7. 862	0. 721	+0. 65	− 5. 8
Mar. 4	11 22 18	8 26 27. 70	+ 3 44 35. 1	+0 46. 94	− 1 25. 3	t25, 5	9. 310	0. 706	+0. 54	− 6. 2
7	11 53 46	8 25 40. 03	+ 4 8 35. 0	−1 26. 89	+ 6 57. 2	t25, 5	9. 446	0. 707	+0. 52	− 6. 3
24	10 11 3	8 25 25. 01	+ 6 10 33. 4	+0 49. 45	− 8 19. 0	t30, 6	9. 342	0. 683	+0. 30	− 5. 8

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
(547) PRAXEDIS							
h m s	° ′ ″			in.			
19 43 14. 13	+ 5 33 15. 4	AG Leipzig II 9553	5	26	---	Fn.	
19 44 24. 15	+ 5 31 7. 0	AG Leipzig II 9566	5	26	---	Fn.	
(554) PERAGA							
11 15 15. 02	+ 0 11 35. 9	AG Nicolajew 3226	2	26	---	Fn.	
11 14 52. 67	+ 0 18 53. 2	AG Nicolajew 3225	3	26	---	Fn.	
11 14 25. 15	+ 0 38 40. 6	AG Nicolajew 3222	3	26	---	Fn.	
23 45 1. 16	+ 3 4 25. 8	AG Albany 8165	2½	12	---	C.	Practice obsn.
23 42 11. 82	+ 3 1 54. 9	AG Albany 8154	2½	12	---	C.	Practice obsn.
23 31 46. 22	+ 2 13 51. 3	AG Albany 8119	--	12	---	C.	Practice obsn.
23 31 43. 33	+ 1 59 31. 1	AG Albany 8118	--	12	---	C.	Practice obsn.
23 23 31. 38	+ 1 26 6. 6	AG Albany 8081	--	12	---	C.	Practice obsn.
23 26 8. 90	+ 1 32 33. 6	AG Albany 8086	--	12	---	C.	Practice obsn.
23 22 36. 81	+ 1 14 52. 3	AG Albany 8077	--	12	---	C.	Practice obsn.
(569) MISA							
5 13 57. 58	+24 33 17. 0	AG Berlin B 1702	--	12	---	Ep.	
5 5 22. 88	+24 17 29. 9	AG Berlin B 1664	--	12	---	Ep.	
5 1 26. 71	+24 16 8. 0	AG Berlin B 1638	3	12	---	Ep.	
(588) ACHILLES							
11 23 50. 45	− 5 11 45. 6	AG Straszburg 4315	4	26	388	Bn.	
11 19 2. 33	− 4 53 45. 0	AG Straszburg 4296	5	26	388	Bn.	
11 19 6. 28	− 4 51 18. 6	Comp. with AG Straszburg 4290	4	26	388	Bn.	Haze. Ft.
11 22 16. 20	− 4 52 25. 8	AG Straszburg 4309	4	26	183	Bn.	V. ft.
(600) MUSA							
7 22 56. 34	+15 42 54. 6	AG Berlin A 2850	2	26	---	Fn.	
7 25 50. 55	+15 43 11. 1	AG Berlin A 2874	2	26	---	Fn.	
7 22 12. 52	+15 50 36. 8	AG Berlin A 2844	4	26	---	Fn.	
(611) VALERIA							
8 42 3. 52	− 0 0 58. 5	AG Nicolajew 2700	--	26	---	Fn.	$12^m.7$.
8 31 47. 02	+ 1 52 2. 9	AG Albany 3454	--	26	---	Hd.	
8 30 27. 02	+ 1 59 18. 7	AG Albany 3445	--	26	---	Fn.	
8 33 2. 58	+ 1 58 53. 3	AG Albany 3463	--	26	---	Fn.	
8 25 40. 22	+ 3 46 6. 6	AG Albany 3399	--	26	---	Hd.	$12^m.0$. Good obsn.
8 27 6. 40	+ 4 1 44. 1	AG Albany 3416	--	26	---	Fn.	
8 24 35. 26	+ 6 18 58. 2	AG Leipzig II 4617	--	26	---	Fn.	

Date	W. M. T.	Apparent Place of Asteroid		Asteroid—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
				(622) ESTHER						
1908	h m s	h m s	° ′ ″	m s	′ ″				s	″
Apr. 3	10 30 21	13 0 29. 26	+ 4 31 10. 2	−1 5. 44	+ 4 52. 9	t29, 6	9. 295n	0. 698	+0. 98	− 5. 8
4	12 18 31	12 59 32. 36	+ 4 38 38. 5	−1 33. 29	+ 3 36. 1	t25, 5	8. 360	0. 692	+0. 98	− 5. 8
May 2	10 26 5	12 38 13. 49	+ 6 52 52. 0	−0 33. 23	− 4 8. 0	t25, 5	8. 785	0. 667	+0. 98	− 3. 8
				(624) HEKTOR						
1913										
Aug. 25	12 58 51	22 41 31. 59	−10 30 21. 0	−1 35. 47	+ 1 11. 3	t30, 10	8. 822	0. 822	+3. 57	+17. 8
31	11 44 22	22 38 18. 57	−10 38 13. 9	+0 49. 67	− 3 40. 8	t30, 10	8. 482n	0. 824	+3. 66	+17. 6
Sept. 5	11 50 3	22 35 36. 11	−10 44 31. 5	−1 42. 58	− 4 14. 8	t30, 10	8. 427	0. 825	+3. 67	+17. 7
9	10 46 53	22 33 29. 45	−10 49 10. 2	+1 22. 21	− 5 5. 1	t30, 10	8. 815n	0. 824	+3. 71	+17. 4
25	10 18 50	22 25 41. 55	−11 2 44. 1	−0 24. 84	+ 4 23. 5	t30, 10	8. 328	0. 827	+3. 71	+16. 7
Oct. 3	10 55 49	22 22 28. 73	−11 5 23. 5	−3 13. 90	− 2 13. 1	t30, 6	9. 214	0. 821	+3. 65	+16. 4
1915										
Nov. 1	8 49 38	1 52 50. 08	+31 29 31. 9	+3 3. 61	+ 2 53. 6	t25, 5	9. 273n	0. 125	+4. 88	+29. 6
2	9 13 8	1 52 15. 00	+31 27 27. 4	+3 34. 04	− 4 22. 6	t25, 5	9. 408n	0. 189	+4. 88	+29. 8
3	9 17 3	1 51 39. 09	+31 25 15. 0	+1 52. 62	− 1 23. 5	t30, 6	9. 377n	0. 173	+4. 88	+29. 8
				(636) ERIKA						
1908										
Apr. 3	11 34 16	13 45 16. 03	− 8 13 58. 5	+2 7. 29	+ 5 57. 7	t25, 5	9. 212n	0. 804	+0. 96	− 5. 2
6	11 37 53	13 42 51. 25	− 8 5 47. 0	+0 19. 52	− 3 10. 2	t30, 6	9. 110n	0. 804	+1. 00	− 5. 4
6	11 37 39	13 42 51. 16	− 8 5 45. 8	+0 7. 71	− 4 45. 2	t25, 5	9. 111n	0. 804	+1. 00	− 5. 4
				(638) MOIRA						
1908										
Sept. 29	9 59 7	23 49 25. 94	−13 9 12. 0	−1 53. 98	− 9 32. 2	t25, 5	9. 187	0. 834	+2. 48	+15. 0
Oct. 2	11 39 13	23 47 4. 79	−13 21 22. 4	+0 51. 40	− 1 40. 6	t25, 5	8. 890	0. 840	+2. 46	+16. 8
				(645) AGRIPPINA						
1909										
Jan. 21	12 37 36	5 56 14. 98	+33 45 44. 1	+0 35. 43	− 0 16. 2	t25, 5	9. 560	0. 232	+0. 37	+ 2. 8
22	12 38 31	5 55 42. 03	+33 42 47. 8	−2 22. 31	− 1 56. 4	t25, 5	9. 571	0. 249	+0. 38	+ 2. 8
				(651) ANTIKLEIA						
1912										
Oct. 16	12 57 37	1 20 28. 21	+ 2 51 54. 3	+1 15. 98	+ 0 9. 9	t30, 10	9. 188	0. 713	+3. 42	+24. 0
Nov. 2	10 32 48	1 6 27. 40	+ 2 45 6. 1	+0 55. 43	+ 7 58. 9	t25, 5	8. 461	0. 713	+3. 47	+23. 6
9	10 54 16	1 1 50. 44	+ 2 50 54. 0	−0 58. 18	+ 0 58. 6	t30, 6	9. 128	0. 713	+3. 43	+23. 3
11	10 57 31	1 0 42. 71	+ 2 53 38. 6	−0 54. 08	+ 5 0. 3	t25, 5	9. 197	0. 713	+3. 43	+23. 2
12	10 0 51	1 0 12. 01	+ 2 55 9. 8	+1 14. 87	+ 7 45. 7	t25, 5	8. 748	0. 711	+3. 43	+23. 2
29	9 37 22	0 54 50. 32	+ 3 41 3. 5	+0 37. 37	− 3 8. 6	t30, 10	9. 179	0. 705	+3. 34	+22. 7
				(654) ZELINDA						
1908										
Jan. 29	7 49 23	7 3 16. 88	+ 8 43 21. 8	+0 8. 47	− 1 44. 6	t30, 6	9. 478n	0. 667	+0. 48	− 4. 8
29	8 3 58	7 3 16. 31	+ 8 43 13. 4	−1 18. 60	− 2 4. 3	t25, 5	9. 444n	0. 663	+0. 49	− 4. 8
30	11 22 15	7 2 13. 29	+ 8 29 33. 8	+0 28. 92	+ 2 21. 8	t30, 6	9. 049	0. 649	+0. 48	− 5. 0
Feb. 19	8 14 15	6 53 3. 81	+ 5 28 36. 4	−1 12. 01	+ 4 3. 9	t24, 5	8. 947n	0. 684	+0. 35	− 6. 3
22	8 17 32	6 53 13. 35	+ 5 9 47. 4	−0 20. 96	+ 1 8. 7	t25, 5	8. 770n	0. 687	+0. 31	− 6. 5
Mar. 14	9 47 59	7 4 35. 27	+ 3 37 54. 8	+1 3. 09	− 2 4. 3	t25, 5	9. 399	0. 710	+0. 06	− 7. 3

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
(622) ESTHER							
h m s	° ′ ″			in.			
13 1 33. 72	+ 4 26 23. 1	AG Albany 4642	--	26	---	Hd.	$14^m.0$.
13 1 4. 67	+ 4 35 8. 2	AG Albany 4641	--	26	---	Fn.	
12 38 45. 74	+ 6 57 3. 8	AG Leipzig II 6210	--	26	---	Fn.	
(624) HEKTOR							
22 43 3. 49	−10 31 50. 1	AG Harvard 8020	2	26	388	Bn.	
22 37 25. 24	−10 34 50. 7	AG Harvard 7999	2	26	388	Bn.	
22 37 15. 02	−10 40 34. 4	AG Harvard 7998	2	26	388	Bn.	
22 32 3. 53	−10 44 22. 5	AG Harvard 7974	4	26	388	Bn.	Moonlight. Ft.
22 26 2. 68	−11 7 24. 3	American Ephemeris σ Aquarii	2	26	388	Bn.	
22 25 38. 98	−11 3 26. 8	AG Harvard 7946	3	26	183	Bn.	
1 49 41. 59	+31 26 8. 7	AG Leiden 706	3	26	183	Bn.	
1 48 36. 08	+31 31 20. 2	AG Leiden 702	3	26	183	Bn.	
1 49 41. 59	+31 26 8. 7	AG Leiden 706	2	26	183	Bn.	
(636) ERIKA							
13 43 7. 78	− 8 19 51. 0	AG Wien-Ottakring 4917	--	26	---	Hd.	$12^m.8$.
13 42 30. 73	− 8 2 31. 4	AG Wien-Ottakring 4913	--	26	---	Hd.	
13 42 42. 45	− 8 0 55. 2	AG Wien-Ottakring 4915	--	26	---	Hd.	
(638) MOIRA							
23 51 17. 44	−12 59 54. 8	AG Harvard 8305	1	26	---	Fn.	$12^m.8$.
23 46 10. 93	−13 19 58. 6	AG Harvard 8282	4	26	---	Fn.	Used s. pr. component of star.
(645) AGRIPPINA							
5 55 39. 18	+33 45 57. 5	AG Leiden 2402	2	26	---	Fn.	
5 58 3. 96	+33 44 41. 4	AG Leiden 2423	3	26	---	Fn.	$12^m.9$.
(651) ANTIKLEIA							
1 19 8. 81	+ 2 51 20. 4	AG Albany 381	2	26	388	Ws.	
1 5 28. 50	+ 2 36 43. 6	AG Albany 314	3	26	183	Ws.	
1 2 45. 19	+ 2 49 32. 1	AG Albany 297	2	26	183	Bn.	
1 1 33. 36	+ 2 48 15. 1	AG Albany 290	4	26	183	Bn.	
0 58 53. 71	+ 2 47 0. 9	AG Albany 275	3	26	183	Bn.	V. ft. Seemed a little hazy.
0 54 9. 61	+ 3 43 49. 4	AG Albany 245	3	26	388	Ws.	Ft.
(654) ZELINDA							
7 3 7. 93	+ 8 45 11. 2	AG Leipzig II 3531	--	26	---	Fn.	
7 4 34. 42	+ 8 45 22. 5	AG Leipzig II 3552	--	26	---	Fn.	
7 1 43. 89	+ 8 27 17. 0	AG Leipzig II 3513	--	26	---	Fn.	
6 54 15. 47	+ 5 24 38. 8	AG Leipzig II 3408	--	26	---	Hd.	
6 53 34. 00	+ 5 8 45. 2	AG Leipzig II 3394	--	26	---	Hd.	
7 3 32. 12	+ 3 40 6. 4	AG Albany 2635	--	26	---	Fn.	

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
(655) BRISEIS										
1909	h m s	h m s	° ′ ″	m s	′ ″				s	″
Feb. 25	14 9 13	9 19 31. 31	+17 49 46. 9	+3 49. 89	− 6 38. 0	t10, 2	9. 552	0. 583	+0. 75	− 1. 8
Mar. 10	8 43 47	9 12 1. 61	+18 41 43. 8	+2 51. 64	+ 3 40. 7	t24, 5	9. 196n	0. 496	+0. 68	− 1. 0
11	9 2 45	9 11 33. 96	+18 44 58. 2	+3 6. 05	− 5 22. 1	t24, 5	9. 040n	0. 486	+0. 67	− 0. 9
15	10 42 50	9 9 56. 48	+18 56 50. 0	+0 30. 34	− 4 23. 2	t29, 6	9. 133	0. 486	+0. 66	− 0. 8
17	10 43 3	9 9 16. 89	+19 1 55. 6	+1 59. 21	− 0 56. 7	t29, 6	9. 186	0. 488	+0. 64	− 0. 6
(659) NESTOR										
1925										
Oct. 15	11 51 6	1 26 3. 10	+12 27 15. 4	+4 26. 90	− 0 54. 2	t14, 3	7. 577	0. 590	+2. 84	+15. 0
19	9 42 30	1 23 58. 43	+12 16 54. 2	+4 40. 95	+ 1 8. 0	t25, 5	9. 332n	0. 610	+2. 84	+15. 2
23	10 13 22	1 21 51. 66	+12 6 6. 6	−3 7. 90	+ 0 53. 5	t24, 5	9. 086n	0. 601	+2. 89	+15. 2
Nov. 9	9 43 50	1 13 49. 71	+11 22 7. 4	−2 29. 36	− 1 26. 3	t25, 5	8. 484n	0. 607	+2. 88	+16. 0
(660) CRESCENTIA										
1908										
Jan. 12	12 2 6	8 13 51. 34	+ 5 17 9. 0	+0 21. 51	− 4 28. 2	t18, 6	8. 967n	0. 686	+0. 40	− 2. 4
14	10 37 21	8 12 8. 08	+ 5 28 11. 2	+0 20. 42	+ 2 16. 8	t30, 6	9. 367n	0. 691	+0. 43	− 2. 7
19	10 25 23	8 7 34. 51	+ 5 59 28. 6	+0 36. 38	− 4 44. 8	t30, 6	9. 326n	0. 684	+0. 49	− 3. 4
24	9 54 37	8 2 57. 33	+ 6 34 24. 5	+1 15. 97	− 3 45. 0	t30, 6	9. 349n	0. 679	+0. 54	− 3. 8
29	10 52 7	7 58 20. 04	+ 7 12 48. 6	+1 44. 86	+ 2 55. 5	t25, 5	8. 836n	0. 663	+0. 56	− 4. 4
Mar. 7	8 1 51	7 37 15. 90	+12 23 13. 6	+0 8. 84	+ 8 15. 2	t30, 5	8. 840n	0. 593	+0. 31	− 4. 5
10	8 28 23	7 37 8. 05	+12 44 55. 2	−2 10. 85	− 7 15. 2	t25, 5	7. 965	0. 586	+0. 28	− 4. 4
21	8 57 32	7 38 46. 14	+13 56 15. 5	+0 13. 46	+ 3 2. 0	t30, 6	9. 183	0. 577	+0. 11	− 3. 6
24	8 36 38	7 39 45. 51	+14 13 17. 3	+2 13. 47	− 2 50. 8	t15, 3	9. 123	0. 570	+0. 05	− 3. 6
24	8 36 38	7 39 45. 43	+14 13 16. 8	+0 41. 31	− 0 18. 3	t15, 3	9. 123	0. 570	+0. 06	− 3. 6
1909										
May 8	11 56 21	16 38 57. 07	+ 3 52 54. 8	+2 31. 75	+ 4 22. 1	t25, 5	9. 275n	0. 704	+1. 23	− 7. 5
13	11 40 10	16 35 33. 87	+ 4 26 31. 0	−0 34. 93	+ 2 50. 5	t30, 6	9. 245n	0. 698	+1. 33	− 7. 2
24	10 51 20	16 26 48. 79	+ 5 18 53. 7	+2 28. 86	+ 1 51. 1	t25, 5	9. 231n	0. 689	+1. 50	− 5. 6
29	10 41 0	16 22 32. 68	+ 5 31 11. 4	+0 21. 24	− 1 4. 9	t25, 5	9. 160n	0. 685	+1. 53	− 5. 0
June 15	11 27 28	16 9 2. 26	+ 5 14 25. 1	+0 15. 47	− 0 43. 6	t25, 5	9. 027	0. 687	+1. 61	− 2. 7
(661) CLOELIA										
1908										
Feb. 26	12 50 3	10 17 28. 20	+11 24 50. 5	+0 51. 33	− 7 34. 7	t25, 5	9. 047	0. 610	+0. 76	− 5. 0
Mar. 3	10 5 24	10 12 19. 36	+11 34 40. 6	−2 46. 79	− 1 5. 1	t25, 5	9. 208n	0. 612	+0. 78	− 4. 9
7	10 22 15	10 8 58. 84	+11 40 19. 1	−3 54. 35	− 4 16. 7	t20, 4	8. 959n	0. 605	+0. 78	− 4. 9
9	10 59 36	10 7 21. 92	+11 42 45. 2	−1 10. 60	− 4 50. 4	t20, 4	7. 603	0. 601	+0. 77	− 4. 9
9	10 59 32	10 7 21. 92	+11 42 45. 3	−1 21. 79	− 5 41. 5	t25, 5	7. 588	0. 601	+0. 77	− 4. 9
21	13 19 41	9 59 9. 82	+11 50 14. 8	−2 40. 38	+12 44. 6	t20, 4	9. 550	0. 650	+0. 71	− 4. 4
24	11 53 34	9 57 36. 60	+11 50 9. 7	+3 31. 42	− 2 17. 5	t25, 5	9. 384	0. 621	+0. 66	− 4. 3
27	12 40 58	9 56 12. 43	+11 49 8. 5	+2 7. 27	− 3 18. 8	t25, 5	9. 529	0. 645	+0. 64	− 4. 2
Apr. 3	9 34 23	9 53 50. 38	+11 43 26. 3	+0 18. 68	− 9 31. 8	t18, 6	8. 764	0. 602	+0. 57	− 3. 8
3	9 34 25	9 53 50. 28	+11 43 27. 9	−0 14. 81	− 8 59. 8	t18, 6	8. 765	0. 602	+0. 57	− 3. 8
(662) NEWTONIA										
1908										
May 2	9 28 16	13 40 15. 13	− 3 5 48. 9	+1 20. 25	− 2 24. 5	t25, 5	9. 242n	0. 766	+1. 14	− 5. 4

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
		(655) BRISEIS					
h m s	° ′ ″			in.			
9 15 40. 67	+17 56 26. 7	AG Berlin A 3775	--	26	---	Ep.	Trouble with illumination.
9 9 9. 29	+18 38 4. 1	AG Berlin A 3732	--	26	---	Ep.	
9 8 27. 24	+18 50 21. 2	Comp. with Küstner 300	2	26	---	Ep.	
9 9 25. 48	+19 1 14. 0	AG Berlin A 3735	2	26	---	Ep.	
9 7 17. 04	+19 2 52. 9	AG Berlin A 3721	2	26	---	Ep.	
		(659) NESTOR					
1 21 33. 36	+12 27 54. 6	AG Leipzig I 404	2	26	183	Bn.	Stopped by clds. Ft.
1 19 14. 64	+12 15 31. 0	AG Leipzig I 392	4	26	183	Bn.	
1 24 56. 67	+12 4 57. 9	AG Leipzig I 419	3	26	183	Bn.	Haze. V. ft.
1 16 16. 19	+11 23 17. 7	AG Leipzig I 370	3	26	183	Bn.	
		(660) CRESCENTIA					
8 13 29. 43	+ 5 21 39. 6	AG Leipzig II 4489	--	26	---	Hd.	11^m.
8 11 47. 23	+ 5 25 57. 1	AG Leipzig II 4472	--	26	---	Fn.	
8 6 57. 64	+ 6 4 16. 8	AG Leipzig II 4419	--	26	---	Hd.	
8 1 40. 82	+ 6 38 13. 3	AG Leipzig II 4355	--	26	---	Fn.	Obsn. unsatisfactory. Planet passed over a star.
7 56 34. 62	+ 7 9 57. 5	AG Leipzig II 4303	--	26	---	Fn.	
7 37 6. 75	+12 15 2. 9	AG Leipzig I 3052	4	26	---	Hd.	
7 39 18. 62	+12 52 14. 8	AG Leipzig I 3070	5	26	---	Hd.	
7 38 32. 57	+13 53 17. 1	AG Leipzig I 3063	--	26	---	Hd.	
7 37 31. 99	+14 16 11. 7	AG Leipzig I 3054	--	26	---	Fn.	Stopped because electricity was cut off.
7 39 4. 06	+14 13 38. 7	AG Leipzig I 3067	--	26	---	Fn.	
16 36 24. 09	+ 3 48 40. 2	AG Albany 5518	--	26	---	Fn.	
16 36 7. 47	+ 4 23 47. 7	AG Albany 5517	3	26	---	Fn.	
16 24 18. 43	+ 5 17 8. 2	AG Leipzig II 7345	2	26	---	Fn.	
16 22 9. 91	+ 5 32 21. 3	AG Leipzig II 7329	3	26	---	Fn.	Haze.
16 8 45. 18	+ 5 15 11. 4	AG Leipzig II 7229	3	26	---	Fn.	
		(661) CLOELIA					
10 16 36. 11	+11 32 30. 2	AG Leipzig I 4001	--	26	---	Hd.	$12^m.5$.
10 15 5. 37	+11 35 50. 6	AG Leipzig I 3998	--	26	---	Hd.	$12^m.5$.
10 12 52. 41	+11 44 40. 7	AG Leipzig I 3985	--	26	---	Fn.	
10 8 31. 75	+11 47 40. 5	Yarnall 4341	--	26	---	Hd.	
10 8 42. 94	+11 48 31. 7	Yarnall 4344	--	26	---	Hd.	
10 1 49. 49	+11 37 34. 6	AG Leipzig I 3946	--	26	---	Fn.	Poor obsn. Brt. moonlight. Haze.
9 54 4. 52	+11 52 31. 5	AG Leipzig I 3912	--	26	---	Fn.	
9 54 4. 52	+11 52 31. 5	AG Leipzig I 3912	--	26	---	Hd.	Poor obsn. Wind shakes telescope.
9 53 31. 13	+11 53 1. 9	AG Leipzig I 3908	--	26	---	Hd.	
9 54 4. 52	+11 52 31. 5	AG Leipzig I 3912	--	26	---	Hd.	
		(662) NEWTONIA					
13 38 53. 74	− 3 3 19. 0	AG Straszburg 4919	--	26	---	Fn.	$13^m.0$.

(675) LUDMILLA

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1908	h m s	h m s	° ′ ″	m s	′ ″				s	″
Sept. 1	10 14 22	23 10 36. 85	+12 14 34. 7	+0 35. 38	− 0 55. 3	t25, 5	9. 408n	0. 619	+2. 30	+13. 2
1	10 24 32	23 10 36. 64	+12 14 35. 2	−0 45. 24	− 0 6. 1	t30, 6	9. 377n	0. 615	+2. 30	+13. 2
6	10 3 59	23 6 31. 89	+12 1 1. 5	−1 48. 02	− 2 15. 4	t25, 5	9. 366n	0. 617	+2. 33	+14. 2
15	10 4 10	22 58 58. 88	+11 22 59. 7	−0 12. 45	− 0 33. 2	d8, 8	9. 182n	0. 614	+2. 37	+15. 4
16	9 10 45	22 58 11. 29	+11 18 0. 0	−1 0. 04	− 5 33. 0	t25, 5	9. 383n	0. 628	+2. 37	+15. 5
22	9 53 5	22 53 23. 83	+10 43 26. 9	+0 47. 11	+ 0 58. 7	t25, 5	9. 036n	0. 619	+2. 36	+16. 2
29	8 41 17	22 47 3. 00	+ 9 58 19. 1	−0 43. 45	+ 2 26. 8	t25, 5	9. 259n	0. 636	+2. 33	+16. 6
Oct. 6	11 31 38	22 44 29. 97	+ 9 9 17. 5	−2 49. 77	− 2 0. 3	t25, 5	9. 326	0. 649	+2. 29	+17. 1
13	10 26 57	22 41 49. 53	+ 8 21 43. 8	−0 29. 86	− 6 51. 9	t25, 5	9. 168	0. 653	+2. 22	+17. 2
16	9 15 44	22 41 5. 85	+ 8 2 19. 5	+1 20. 75	− 2 4. 8	t25, 5	8. 491	0. 652	+2. 18	+17. 3
18	10 23 10	22 40 44. 06	+ 7 49 14. 7	+0 37. 47	− 8 34. 8	t25, 5	9. 253	0. 662	+2. 17	+17. 3

(690) WRATISLAWIA

Date	W. M. T.	App. α	App. δ	Ast.—Star α	Ast.—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1911										
Jan. 23	9 48 6	8 12 25. 77	+ 7 41 11. 9	−1 21. 13	− 0 33. 4	t25, 5	9. 409n	0. 671	+0. 87	+ 2. 4
24	9 11 16	8 11 36. 62	+ 7 42 26. 8	−0 23. 82	+ 3 27. 2	t29, 6	9. 488n	0. 678	+0. 88	+ 2. 3
25	8 51 4	8 10 46. 92	+ 7 43 44. 0	−1 9. 95	+ 3 49. 3	t28, 6	9. 519n	0. 682	+0. 89	+ 2. 2
28	9 18 0	8 8 16. 71	+ 7 48 5. 1	+1 18. 53	− 1 57. 8	t30, 6	9. 426n	0. 671	+0. 93	+ 2. 0

(712) BOLIVIANA

Date	W. M. T.	App. α	App. δ	Ast.—Star α	Ast.—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1918										
Sept. 27	11 53 20	1 38 12. 95	+23 15 48. 8	+2 39. 95	− 4 20. 4	t24, 5	9. 232n	0. 399	+4. 88	+24. 0

(718) ERIDA

Date	W. M. T.	App. α	App. δ	Ast.—Star α	Ast.—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1914										
Mar. 20	13 6 59	9 8 2. 86	+26 12 11. 3	−1 36. 68	+ 3 33. 3	t30, 6	9. 634	0. 520	+2. 36	− 0. 1
23	10 31 26	9 7 21. 07	+26 4 41. 4	+2 59. 17	− 6 19. 4	t30, 6	9. 276	0. 330	+2. 31	+ 0. 6

(738) ALAGASTA

Date	W. M. T.	App. α	App. δ	Ast.—Star α	Ast.—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1908										
Feb. 24	9 8 41	8 28 10. 78	+19 17 6. 9	+0 23. 00	− 1 44. 8	t25, 5	9. 134n	0. 480	+0. 61	− 3. 3
Mar. 3	11 10 44	8 24 17. 07	+19 39 9. 2	+2 19. 33	+ 3 10. 3	t25, 5	9. 280	0. 485	+0. 54	− 2. 8

(755) QUINTILLA

Date	W. M. T.	App. α	App. δ	Ast.—Star α	Ast.—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1908										
May 2	11 11 23	14 11 50. 04	− 9 55 49. 3	+1 59. 57	+ 3 16. 0	t25, 5	8. 556n	0. 819	+1. 22	− 5. 5
9	13 9 12	14 6 55. 55	− 9 25 14. 6	−0 44. 78	+ 2 55. 1	t25, 5	9. 404	0. 804	+1. 24	− 5. 6
June 5	10 33 4	13 55 16. 02	− 8 18 29. 2	−1 41. 46	− 0 27. 8	t25, 5	9. 267	0. 803	+1. 18	− 5. 0

(756) LILLIANA

Date	W. M. T.	App. α	App. δ	Ast.—Star α	Ast.—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1908										
May 23	12 32 12	14 46 8. 59	− 5 24 40. 2	+1 36. 50	− 0 3. 8	t25, 5	9. 333	0. 781	+1. 34	− 4. 2
25	10 54 57	14 45 3. 92	− 5 10 42. 3	+1 50. 53	− 3 19. 6	t24, 5	8. 666	0. 785	+1. 35	− 4. 1
June 1	12 17 30	14 41 36. 84	− 4 25 31. 1	−2 52. 82	+11 46. 7	t15, 3	9. 412	0. 772	+1. 36	− 3. 5
5	9 17 18	14 40 5. 36	− 4 4 41. 8	−1 2. 52	− 3 44. 2	t25, 5	8. 721n	0. 776	+1. 34	− 3. 3

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
(675) LUDMILLA							
h m s	° ′ ″			in.			
23 9 59. 17	+12 15 16. 8	AG Leipzig I 9254	2	26	---	Fn.	10.m8.
23 11 19. 58	+12 14 28. 1	AG Leipzig I 9264	2	26	---	Fn.	
23 8 17. 58	+12 3 2. 7	AG Leipzig I 9243	--	26	---	Fn.	Used s. f. component of star.
22 59 8. 96	+11 23 17. 5	AG Leipzig I 9195	3	26	---	Fn.	10.m3.
22 59 8. 96	+11 23 17. 5	AG Leipzig I 9195	5	26	---	Fn.	Sky thick.
22 52 34. 36	+10 42 12. 0	AG Leipzig I 9151	2	26	---	Fn.	
22 47 44. 12	+ 9 55 35. 7	AG Leipzig II 11431	1	26	---	Fn.	10.m3.
22 47 17. 45	+ 9 11 0. 7	AG Leipzig II 11426	1	26	---	Fn.	
22 42 17. 17	+ 8 28 18. 5	AG Leipzig II 11393	1	26	---	Fn.	
22 39 42. 92	+ 8 4 7. 0	AG Leipzig II 11377	3	26	---	Fn.	
22 40 4. 42	+ 7 57 32. 2	AG Leipzig II 11378	3	26	---	Fn.	
(690) WRATISLAWIA							
8 13 46. 03	+ 7 41 42. 9	AG Leipzig II 4491	2	12	---	Ep.	11.m2.
8 11 59. 56	+ 7 38 57. 3	AG Leipzig II 4473	--	12	---	Ep.	
8 11 55. 98	+ 7 39 52. 5	AG Leipzig II 4471	3	12	---	Ep.	
8 6 57. 25	+ 7 50 0. 9	AG Leipzig II 4415	2	12	---	Ep.	
(712) BOLIVIANA							
1 35 28. 12	+23 19 45. 2	AG Berlin B 505	--	12	---	C.	
(718) ERIDA							
9 9 37. 18	+26 8 38. 1	AG Cambridge 4881	3	26	183	Bn.	
9 4 19. 59	+26 11 0. 2	AG Cambridge 4841	3	26	183	Bn.	Ft. at times. Haze.
(738) ALAGASTA							
8 27 47. 17	+19 18 55. 0	AG Berlin A 3391	--	26	---	Hd.	12.m7.
8 21 57. 20	+19 36 1. 7	AG Berlin A 3338	--	26	---	Hd.	13.m0.
(755) QUINTILLA							
14 9 49. 25	− 9 58 59. 8	AG Wien-Ottakring 5042	--	26	---	Fn.	12.m8.
14 7 39. 09	− 9 28 4. 1	AG Wien-Ottakring 5030	--	26	---	Fn.	V. ft. Moonlight.
13 56 56. 30	− 8 17 56. 4	AG Wien-Ottakring 4982	3	26	---	Fn.	Ft. Moonlight.
(756) LILLIANA							
14 44 30. 75	− 5 24 32. 2	AG Straszburg 5220	--	26	---	Fn.	Sky thick.
14 43 12. 04	− 5 7 18. 6	AG Straszburg 5216	--	26	---	Fn.	12.m7.
14 44 28. 30	− 4 37 14. 3	AG Straszburg 5219	--	26	---	Fn.	
14 41 6. 54	− 4 0 54. 3	AG Straszburg 5209	3	26	---	Fn.	Moonlight.

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pp α	Log pp δ	Star to App. Place α	Star to App. Place δ
(757) PORTLANDIA										
	h m s	h m s	° ′ ″	m s	′ ″				s	″
1908 Oct. 4	12 26 48	1 2 53. 07	+ 4 20 12. 0	+1 47. 08	−5 10. 1	t25, 5	8. 553	0. 696	+2. 51	+15. 9
5	8 36 8	1 2 0. 15	+ 4 19 1. 0	−0 41. 83	−7 43. 2	t25, 5	9. 559*n*	0. 713	+2. 51	+16. 0
12	11 26 16	0 54 23. 48	+ 4 9 23. 7	+0 43. 72	+5 14. 9	t25, 5	7. 743*n*	0. 698	+2. 55	+16. 1
15	10 23 28	0 51 16. 41	+ 4 5 49. 6	+0 10. 47	+4 44. 9	t30, 6	9. 003*n*	0. 700	+2. 56	+16. 3
16	10 56 10	0 50 12. 59	+ 4 4 43. 3	−0 53. 36	+3 38. 6	t25, 5	8. 415*n*	0. 699	+2. 57	+16. 3
Dec. 26	9 0 28	0 44 37. 78	+ 8 12 11. 3	+2 6. 96	+3 23. 9	t15, 3	9. 464	0. 670	+3. 47	+15. 1
1909 Jan. 19	7 34 21	1 12 24. 79	+11 47 9. 0	−0 22. 58	−1 47. 1	t29, 6	9. 420	0. 626	−1. 07	− 4. 7
21	8 1 48	1 15 12. 48	+12 6 47. 7	−1 55. 65	−0 46. 8	t10, 2	9. 499	0. 635	−1. 05	− 4. 6
25	7 47 48	1 20 54. 28	+12 46 17. 8	−0 15. 00	+2 0. 8	t30, 6	9. 491	0. 626	−1. 10	− 4. 6
(784) PICKERINGIA										
1914 Mar. 26	11 44 1	12 20 36. 32	+ 2 36 17. 0	−1 3. 33	+5 28. 0	t30, 6	8. 631*n*	0. 714	+2. 27	− 15. 4
Apr. 3	13 42 52	12 13 8. 03	+ 2 43 8. 2	−1 0. 81	+3 24. 9	t27, 9	9. 410	0. 718	+2. 32	− 15. 2
13	10 16 25	12 4 38. 68	+ 2 44 1. 6	−1 46. 81	−4 24. 2	t30, 6	8. 650*n*	0. 713	+2. 31	− 14. 6
17	11 13 59	12 1 32. 90	+ 2 41 22. 8	+0 43. 84	+1 50. 0	t30, 10	9. 030	0. 714	+2. 31	− 14. 5
21	9 53 6	11 58 48. 89	+ 2 36 58. 5	−2 0. 15	−2 34. 6	t30, 6	8. 224*n*	0. 714	+2. 29	− 14. 2
(796) SARITA										
1914 Dec. 21	10 54 21	1 51 38. 97	+25 15 41. 6	+2 29. 87	−6 6. 2	t25, 5	9. 557	0. 466	+4. 35	+31. 6
27	9 49 54	1 54 10. 31	+25 51 36. 5	−3 3. 90	+1 53. 5	t25, 5	9. 461	0. 396	+4. 35	+31. [illegible]
(856) BACKLUNDA										
1908 Feb. 21	10 5 6	8 17 56. 41	+23 27 45. 6	+1 20. 30	+4 24. 5	t10, 2	8. 349*n*	0. 365	+0. 61	− 2. 5
22	7 43 25	8 17 21. 98	+23 35 19. 5	+3 16. 38	+0 15. 4	t20, 4	9. 477*n*	0. 454	+0. 60	− 2. 4
24	8 28 31	8 16 8. 60	+23 51 53. 0	−0 36. 71	+4 3. 1	t25, 5	9. 297*n*	0. 395	+0. 59	− 2. 3
28	7 29 12	8 14 7. 90	+24 21 47. 0	+0 26. 74	−5 55. 2	t18, 6	9. 446*n*	0. 425	+0. 56	− 2. 0
(886) WASHINGTONIA										
1917 Nov. 24	12 33 6	2 42 13. 91	+10 0 2. 4	+0 41. 85	−2 47. 0	t30, 6	9. 382	0. 643	+5. 16	+23. 9
26	11 49 55	2 40 37. 13	+10 10 11. 2	−0 54. 94	+7 21. 9	t24, 5	9. 256	0. 633	+5. 17	+23. 8
Dec. 5	9 29 18	2 34 28. 55	+10 59 19. 7	+3 27. 78	−0 40. 9	t25, 5	8. 206*n*	0. 612	+5. 17	+24. 6
29	10 55 40	2 28 50. 83	+13 36 29. 6	+2 21. 48	+0 34. 5	t30, 6	9. 520	0. 623	+5. 09	+24. 6
1918 Jan. 9	9 28 22	2 31 35. 63	+14 57 2. 7	−0 7. 87	+9 20. 8	d10, 10	9. 411	0 583	+1. 74	+ 8. 1
12	10 30 4	2 32 53. 49	+15 20 7. 9	+3 49. 98	+6 32. 4	t34, 7	9. 567	0. 620	+1. 72	+ 8. 3
Feb. 4	8 54 28	2 49 0. 67	+18 19 52. 8	−0 10. 72	+1 48. 9	d24, 20	9. 538	0. 570	+1. 54	+ 7. 4
12	7 58 57	2 56 48. 83	+19 22 56. 7	−0 19. 97	−2 16. 2	d12, 10	9. 473	0. 530	+1. 50	+ 7. 3
13	7 51 31	2 57 51. 14	+19 30 49. 0	−0 4. 53	−0 27. 2	d12, 10	9. 462	0. 524	+1. 48	+ 7. 2
Mar. 2	8 2 31	3 17 41. 35	+21 42 36. 8	−0 13. 47	−1 0. 4	d14, 12	9. 584	0. 546	+1. 33	+ 6. 3
5	8 58 6	3 21 35. 33	+22 5 29. 4	−0 23. 48	+1 52. 1	d14, 12	9. 658	0. 612	+1. 32	+ 6. 1
15	8 35 54	3 35 3. 89	+23 18 28. 8	−0 18. 98	−3 45. 3	d16, 12	9. 664	0. 606	+1. 25	+ 5. 6

(757) PORTLANDIA

Mean Place of Star for Beginning of Year α	Mean Place of Star for Beginning of Year δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
1 1 3.48	+ 4 25 6.2	AG Albany 286	3	26	---	Fn.	10.^{m}8.
1 2 39.47	+ 4 26 28.2	AG Albany 299	2	26	---	Fn.	
0 53 37.21	+ 4 3 52.7	AG Albany 242	3	26	---	Fn.	
0 51 3.38	+ 4 0 48.4	AG Albany 231	5	26	---	Fn.	
0 51 3.38	+ 4 0 48.4	AG Albany 231	5	26	---	Fn.	
0 42 27.35	+ 8 8 32.3	AG Leipzig II 260	4	26	---	Fn.	13.^{m}0. Haze interfered.
1 12 48.44	+11 49 0.8	AG Leipzig I 353	--	26	---	Fn.	Sky thick.
1 17 9.18	+12 7 39.1	AG Leipzig I 384	--	26	---	Fn.	
1 21 10.38	+12 44 21.6	AG Leipzig I 407	2	26	---	Fn.	

(784) PICKERINGIA

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
12 21 37.38	+ 2 31 4.4	AG Albany 4485	3	26	183	Ws.	12.^{m}5.
12 14 6.52	+ 2 39 58.5	Comp. with AG Albany 4451	3	26	388	Ws.	
12 6 23.18	+ 2 48 40.4	AG Albany 4442	3	26	183	Ws.	
12 0 46.75	+ 2 39 47.3	AG Albany 4419	3	26	388	Ws.	
12 0 46.75	+ 2 39 47.3	AG Albany 4419	--	26	183	Ws.	V. ft. at last. Haze.

(796) SARITA

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
1 49 4.75	+25 21 16.2	AG Cambridge 1028	3	26	183	Bn.	
1 57 9.86	+25 49 11.7	AG Cambridge 1101	3	26	183	Bn.	

(856) BACKLUNDA

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
8 16 35.50	+23 23 23.6	AG Berlin B 3352	--	26	---	Hd.	Clds.
8 14 5.00	+23 35 6.5	AG Berlin B 3336	--	26	---	Hd.	12^{m}.5.
8 16 44.72	+23 47 52.2	AG Berlin B 3353	--	26	---	Hd.	12^{m}.6.
8 13 40.60	+24 27 44.2	AG Berlin B 3332	--	26	---	Hd.	

(886) WASHINGTONIA

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
2 41 26.90	+10 2 25.5	AG Leipzig II 1015	4	26	183	Bn.	12^{m}. Clds.
2 41 26.90	+10 2 25.5	AG Leipzig II 1015	3	26	183	Hl.	Ft. at last. Moonlight. Haze.
2 30 55.60	+10 59 36.0	AG Leipzig I 750	3	26	183	Bn.	13^{m}.
2 26 24.26	+13 35 30.5	AG Leipzig I 731; Ast Bor +14.0 224, 146.	4	26	183	B.	13^{m}. Ft. Moonlight. Poor obsn.
2 31 41.76	+14 47 33.8	AG Leipzig I 754	4	26	183	B.	13½^{m}.
2 29 1.79	+15 13 27.2	AG Leipzig I 742	3–4	26	183	Hl.	Illumination unsatisfactory.
2 49 9.85	+18 17 56.5	AG Berlin A 778	4	26	183	B.	13½^{m}. Ft. at times.
2 57 7.30	+19 25 5.6	Comp. with AG Berlin A 800	4	26	183	B.	13½^{m}. Ft. at times.
2 57 54.19	+19 31 9.0	Comp. with AG Berlin A 817	3	26	183	B.	13½^{m}. Ft.
3 17 53.49	+21 43 30.9	Ast Par +22°0320, 99; +21°0316, 48	3	26	183	B.	14^{m}.
3 21 57.49	+22 3 31.2	Ast Par +23°0324, 88; +22°0320, 59; +21°0324, 22.	3	26	183	B.	14^{m}. Faint. V. ft. at last. Delayed because asteroid passed near a star.
3 35 21.62	+23 22 8.5	Ast Par +24°0336, 156; +23°0332, 63	3	26	183	B.	14^{m}.

(925) ALPHONSINA

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1920	h m s	h m s	° ′ ″	m s	′ ″				s	″
Jan. 28	9 5 5	7 48 7. 63	+20 51 20. 5	+0 2. 22	+2 9. 2	d10, 8	9. 434n	0. 492	+2. 62	−12. 3
29	8 50 27	7 46 59. 12	+20 45 0. 0	+0 6. 85	−0 52. 2	d10, 8	9. 460n	0. 502	+2. 63	−12. 2
Feb. 10	8 45 39	7 34 48. 21	+19 27 4. 4	+0 18. 42	−0 22. 7	d10, 8	9. 267n	0. 488	+2. 60	−11. 8
13	9 47 1	7 32 18. 45	+19 7 15. 2	+0 14. 03	−2 4. 8	d10, 8	8. 465n	0. 471	+2. 59	−11. 7
26	9 24 28	7 24 59. 23	+17 44 57. 2	+0 2. 58	−6 26. 7	d10, 8	8. 665	0. 499	+2. 43	−11. 5
Mar. 2	8 10 26	7 23 40. 83	+17 14 57. 2	+0 5. 71	+3 43. 5	d10, 8	8. 811n	0. 510	+2. 38	−11. 5
8	9 13 49	7 23 9. 71	+16 39 25. 3	−0 11. 36	+2 9. 8	d10, 8	9. 067	0. 526	+2. 26	−11. 6
18	8 21 34	7 24 45. 66	+15 43 15. 3	+0 3. 71	−3 45. 7	d10, 8	8. 938	0. 539	+2. 11	−11. 7

(950) AHRENSA

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1921										
Apr. 11	12 11 26	12 53 13. 02	+6 58 10. 0	−0 23. 39	+3 34. 8	d10, 8	8. 878	0. 666	+2. 48	−13. 5

(1001) GAUSSIA

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1907										
Dec. 31	11 20 46	6 11 22. 89	+19 47 47. 0	+0 31. 92	+9 50. 6	t25, 5	8. 435n	0. 456	+3. 82	− 4. 0
1908										
Jan. 2	8 44 30	6 9 43. 30	+19 43 0. 6	+1 3. 87	+4 5. 4	t25, 5	9. 494n	0. 532	+0. 29	− 3. 1
8	10 34 57	6 4 38. 16	+19 28 16. 4	+1 32. 17	−0 8. 2	t30, 6	8. 637n	0. 464	+0. 32	− 3. 0

(1009) 1923 PE

Date	W. M. T.	Apparent Place of Asteroid α	Apparent Place of Asteroid δ	Asteroid—Star α	Asteroid—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1923										
Nov. 10	10 43 8	1 21 34. 03	+16 54 32. 2	+0 13. 52	+2 13. 5	d10, 8	8. 904	0. 518	+3. 60	+18. 2
13	8 53 4	1 24 0. 06	+15 20 43. 4	−0 5. 79	−5 56. 6	d11, 8	9. 105n	0. 551	+3. 59	+17. 9
14	8 28 1	1 24 52. 99	+14 49 41. 5	+0 4. 10	−1 56. 6	d10, 8	9. 231n	0. 565	+3. 58	+17. 8
17	9 44 14	1 27 49. 52	+13 15 28. 1	−0 2. 69	−3 13. 5	d10, 9	7. 274	0. 578	+3. 54	+17. 3
28	10 8 50	1 40 59. 11	+ 8 15 6. 2	+0 4. 39	+2 5. 0	d11, 9	9. 047	0. 652	+3. 45	+15. 1
Dec. 1	8 43 46	1 45 6. 83	+ 7 7 58. 1	−0 12. 36	−4 54. 6	d11, 8	8. 641	0. 664	+3. 43	+14. 4
3	8 27 27	1 48 2. 24	+ 6 25 58. 7	+0 1. 14	−1 45. 6	d10, 8	8. 822n	0. 672	+3. 41	+13. 8
12	8 13 39	2 2 29. 38	+ 3 51 19. 9	+0 10. 06	+5 36. 0	d10, 8	8. 715n	0. 701	+3. 40	+11. 7

Mean Place of Star for Beginning of Year		Authority	Seeing	Inst.	Power	Obsr.	Remarks
α	δ						
(925) ALPHONSINA							
h m s	° ′ ″			in.			
7 48 2.79	+20 49 23.6	Ast Par +21°0748, 195	4	26	388	B.	10^m.
7 46 49.64	+20 46 4.4	Comp. with Ast Par +21°0748, 171	3	26	388	B.	10^m.
7 34 27.19	+19 27 38.9	Comp. with AG Berlin A 2963	4	26	183	B.	
7 32 1.83	+19 9 31.7	AG Berlin A 2933	4	26	183	B.	Bothered by wires fluctuating.
7 24 54.22	+17 51 35.4	Ast Bor +17°0724, 110	4	26	183	B.	Moonlight. Clds.
7 23 32.74	+17 11 25.2	Ast Bor +17°0724, 75	4	26	183	B.	Brt. moonlight.
7 23 18.81	+16 37 27.1	Ast Bor +16°0720, 197; +17°0724, 271	4	26	183	B.	Bothered by wires fluctuating.
7 24 39.84	+15 47 12.7	Ast Bor +16°0720, 538	3	26	183	B.	Thick haze. Bothered by wires fluctuating. Poor obsn.
(950) AHRENSA							
12 53 33.93	+ 6 54 48.7	Ast Tou +7°1252, 31	3	26	183	B.	12^m.
(1001) GAUSSIA							
6 10 47.15	+19 38 0.4	AG Berlin A 2032	3	26	---	Hd.	$12^m.8$.
6 8 39.14	+19 38 58.3	AG Berlin A 2003	--	26	---	Fn.	
6 3 5.67	+19 28 27.6	AG Berlin A 1924	--	26	---	Hd.	Last two transits poor. Sky became thick.
(1009) 1923 PE							
1 21 16.91	+16 52 0.5	Ast Bor +17°0116, 118; +16°0120, 23; +17°0124, 64.	3	26	183	B.	
1 24 2.26	+15 26 22.1	Ast Bor +15°0124, 17; +16°0120, 81	3	26	183	B.	Near ft. star during half the obsn.
1 24 45.31	+14 51 20.3	Ast Bor +15°0124, 77	3	26	183	B.	
1 27 48.67	+13 18 24.3	Ast Bor +14°0128, 41	3	26	183	B.	Ft. Moonlight. Wires 10 rev. apart interfered in 2d half of δ.
1 40 51.27	+ 8 12 46.1	Comp. with Ast Tou +7°0140, 21	4	26	183	B.	$13\frac{1}{2}^m$. Ft.
1 45 15.76	+ 7 12 38.3	Ast Tou +7°0140, 57; +7°0148, 2	3	26	183	B.	$13\frac{1}{2}^m$. Haze. Ft.
1 47 57.69	+ 6 27 30.5	Ast Tou +7°0148, 96	2	26	183	B.	Ft. 1st half.
2 2 15.92	+ 3 45 32.2	Comp. with AG Albany 586	3	26	183	B.	Ft. Haze. Poor obsn.

(1036) GANYMED

Date	W. M. T.	Apparent Place of Asteroid		Asteroid—Star		Comp.	Log *pp*		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
1924	h m s	h m s	° ′ ″	m s	′ ″				s	″
Oct. 29	8 48 4	21 35 51. 32	+11 22 13. 9	−0 10. 95	+ 0 53. 4	d8, 8	9. 313	0. 620	+2. 08	+23. 4
31	7 6 39	21 45 11. 21	+10 8 32. 9	+0 2. 92	−13 54. 7	d10, 10	7. 488	0. 624	+2. 12	+23. 1
Nov. 3	7 28 54	21 59 34. 50	+ 8 17 14. 1	+0 19. 79	− 0 44. 5	d10, 8	8. 632	0. 649	+2. 17	+22. 4
3	7 50 9	21 59 44. 78	+ 8 12 41. 7	+0 4. 24	+ 3 6. 9	d10, 9	8. 929	0. 651	+2. 17	+22. 4
4	7 19 27	22 4 15. 16	+ 7 41 47. 0	+0 10. 57	− 5 29. 7	d11, 8	8. 347	0. 656	+2. 18	+22. 2
4	8 28 20	22 4 28. 41	+ 7 40 6. 2	+0 12. 92	+ 5 34. 0	d10, 8	9. 198	0. 662	+2. 18	+22. 1
4	8 47 23	22 4 32. 04	+ 7 39 38. 3	−0 16. 24	− 2 39. 0	d10, 8	9. 286	0. 664	+2. 19	+22. 2
4	9 1 33	22 4 34. 80	+ 7 39 17. 4	−0 8. 63	+ 0 57. 6	d10, 8	9. 339	0. 667	+2. 19	+22. 2
7	8 39 20	22 18 25. 09	+ 5 57 11. 4	+0 35. 60	+ 0 48. 9	d10, 8	9. 240	0. 682	+2. 21	+21. 4
12	7 43 54	22 40 35. 62	+ 3 23 32. 2	+0 34. 81	− 5 39. 8	d12, 8	8. 787	0. 706	+2. 26	+20. 1
14	7 14 41	22 49 7. 45	+ 2 28 20. 9	+1 43. 81	+ 0 9. 4	t30, 6	7. 221	0. 716	+2. 28	+19. 6
17	6 58 47	23 1 37. 94	+ 1 11 51. 1	+0 1. 26	− 9 44. 8	d10, 8	8. 498*n*	0. 729	+2. 32	+18. 9
17	7 18 36	23 1 41. 34	+ 1 11 29. 8	−0 5. 69	+ 5 4. 4	d10, 8	7. 904	0. 729	+2. 32	+18. 9
18	7 3 29	23 5 43. 80	+ 0 48 1. 2	−0 16. 43	− 1 20. 1	d10, 8	8. 350*n*	0. 732	+2. 33	+18. 6
18	7 27 6	23 5 47. 84	+ 0 47 36. 4	−0 16. 52	− 1 32. 2	d12, 13	8. 392	0. 733	+2. 33	+18. 6
19	6 59 20	23 9 45. 50	+ 0 25 15. 8	+0 25. 46	+ 2 6. 8	d10, 8	8. 489*n*	0. 736	+2. 34	+18. 4
19	7 18 43	23 9 48. 60	+ 0 24 56. 5	+0 11. 08	− 6 23. 9	d10, 8	7. 889	0. 736	+2. 34	+18. 4
24	6 49 17	23 29 9. 58	− 1 15 3. 4	+0 18. 40	− 3 8. 0	d10, 8	8. 702*n*	0. 752	+2. 36	+17. 0
24	7 4 34	23 29 12. 00	− 1 15 14. 2	+0 16. 76	+ 0 14. 0	d10, 8	8. 299*n*	0. 752	+2. 36	+17. 0
25	6 54 23	23 32 54. 82	− 1 32 32. 3	−0 24. 14	− 0 37. 2	d10, 8	8. 600*n*	0. 754	+2. 37	+16. 7
25	7 12 27	23 32 57. 52	− 1 32 45. 3	−0 27. 03	− 4 47. 0	d10, 8	7. 579*n*	0. 754	+2. 37	+16. 7
26	6 53 40	23 36 36. 27	− 1 49 5. 0	−0 2. 71	− 2 21. 9	d10, 8	8. 609*n*	0. 757	+2. 38	+16. 5
26	7 5 53	23 36 38. 07	− 1 49 14. 4	−0 14. 88	− 1 36. 2	d10, 8	8. 214*n*	0. 757	+2. 38	+16. 5
28	7 6 21	23 43 52. 57	− 2 17 16. 8	+0 11. 80	− 4 47. 2	d10, 8	8. 151*n*	0. 761	+2. 40	+16. 1
28	7 25 4	23 43 59. 34	− 2 20 3. 2	+0 14. 19	+ 1 17. 2	d10, 8	8. 364	0. 761	+2. 40	+16. 1
Dec. 1	6 49 15	23 54 21. 11	− 2 59 41. 2	−0 0. 39	+ 5 20. 8	d10, 8	8. 659*n*	0. 767	+2. 43	+15. 4
2	6 54 42	23 57 47. 06	− 3 11 33. 2	−0 24. 18	− 0 25. 9	d10, 8	8. 528*n*	0. 769	+2. 44	+15. 2
2	7 19 43	23 57 50. 60	− 3 11 41. 7	−0 26. 52	+ 2 29. 7	d10, 8	8. 210	0. 769	+2. 44	+15. 1
9	6 49 21	0 20 31. 43	− 4 14 55. 5	+0 11. 12	− 4 51. 3	d10, 8	8. 541*n*	0. 777	+2. 46	+13. 4
9	7 3 14	0 20 33. 09	− 4 15 0. 8	−0 9. 63	− 3 5. 8	d10, 8	7. 847*n*	0. 778	+2. 46	+13. 4
10	6 51 54	0 23 37. 23	− 4 21 30. 0	+0 30. 59	+ 1 18. 6	d10, 8	8. 448*n*	0. 778	+2. 46	+13. 2
10	7 5 49	0 23 38. 96	− 4 21 33. 2	−0 12. 54	− 0 30. 5	d10, 8	6. 2 2*n*	0. 778	+2. 46	+13. 1
22	7 6 17	0 58 8. 45	− 5 0 38. 9	−0 15. 57	+ 5 7. 6	d10, 8	8. 422	0. 784	+2. 50	+10. 4
26	6 56 40	1 8 42. 72	− 5 0 22. 5	+0 22. 52	− 6 45. 8	d10, 8	8. 243	0. 784	+2. 54	+ 9. 8
26	7 16 38	1 8 44. 93	− 5 0 19. 9	+0 31. 45	− 0 8. 8	d10, 8	8. 759	0. 783	+2. 54	+ 9. 8
1925										
Jan. 5	6 52 50	1 33 38. 22	− 4 38 46. 5	+0 12. 76	− 7 5. 6	d10, 8	8. 589	0. 781	−0. 48	−10. 6
5	7 12 45	1 33 40. 10	− 4 38 42. 2	−0 6. 05	+ 5 8. 9	d10, 9	8. 894	0. 780	−0. 48	−10. 6
6	6 44 34	1 36 0. 65	− 4 35 16. 9	+0 7. 90	+ 5 20. 3	d12, 8	8. 404	0. 780	−0. 48	−10. 7
6	7 0 18	1 36 2. 09	− 4 35 15. 2	+0 12. 53	+ 2 8. 7	d10, 8	8. 754	0. 780	−0. 48	−10. 7
13	6 56 40	1 52 18. 29	− 4 5 42. 7	+0 33. 54	− 0 25. 8	d12, 8	8. 857	0. 776	−0. 45	−11. 2
13	7 19 58	1 52 20. 37	− 4 5 37. 3	−0 5. 64	− 5 38. 1	d10, 8	9. 070	0. 775	−0. 45	−11. 2
20	6 53 56	2 7 54. 75	− 3 29 0. 8	+0 37. 95	+ 1 36. 8	d10, 8	8. 954	0. 771	−0. 47	−11. 9
20	7 16 8	2 7 56. 74	− 3 28 55. 1	−0 10. 12	+ 5 17. 6	d10, 8	9. 124	0. 770	−0. 46	−11. 9
30	7 2 32	2 29 54. 17	− 2 28 28. 2	+0 16. 52	− 4 36. 9	d10, 8	9. 147	0. 762	−0. 47	−12. 3
Feb. 3	6 57 51	2 37 41. 56	− 2 2 38. 1	+0 0. 11	+ 4 2. 3	d10, 8	9. 166	0. 758	−0. 48	−12. 6
3	7 41 28	2 37 45. 09	− 2 2 28. 3	−0 15. 92	− 1 15. 8	d12, 8	9. 354	0. 756	−0. 48	−12. 5
18	6 53 14	3 8 4. 26	− 0 23 29. 9	+0 10. 62	− 2 49. 8	d10, 8	9. 281	0. 744	−0. 53	−12. 9
18	7 19 53	3 8 6. 40	− 0 23 22. 2	−0 9. 60	− 0 49. 6	d10, 8	9. 377	0. 743	−0. 53	−12. 9
24	6 58 25	3 19 55. 86	+ 0 15 41. 9	−0 6. 48	− 1 10. 2	d10, 8	9. 345	0. 738	−0. 56	−12. 8
24	7 22 34	3 19 57. 83	+ 0 15 47. 9	−0 3. 41	− 3 34. 3	d10, 10	9. 419	0. 738	−0. 56	−12. 8
Mar. 2	7 9 44	3 31 40. 19	+ 0 53 44. 7	−0 14. 36	− 3 24. 5	d10, 8	9. 416	0. 733	−0. 60	−13. 0
2	7 32 52	3 31 42. 11	+ 0 53 52. 0	−0 16. 30	+ 7 57. 8	d12, 8	9. 473	0. 734	−0. 60	−13. 0
6	7 10 15	3 39 25. 34	+ 1 18 14. 5	+0 6. 18	+ 1 27. 0	d10, 8	9. 439	0. 730	−0. 62	−12. 9
23	7 51 11	4 11 54. 14	+ 2 52 1. 5	+0 13. 92	− 0 27. 8	d10, 10	9. 578	0. 724	−0. 73	−12. 5

(1036) GANYMED

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
21 36 0. 19	+11 20 57. 1	Ast Tou +11°2132, 137	3	26	183	B.	9.ᵐ0.
21 45 6. 17	+10 22 4. 5	Ast Tou +11°2140, 263 (used step star)	3	26	183	B.	9.ᵐ0. Step star ft. Wires 10 rev. apart interfered in α.
21 59 12. 54	+ 8 17 36. 2	Ast Tou +9°2156, 132	1–2	26	183	B.	
21 59 38. 37	+ 8 9 12. 4	Ast Tou +7°2156, 136	2	26	183	B.	
22 4 2. 41	+ 7 46 54. 5	Ast Tou +7°2204, 22	4	26	183	B.	
22 4 13. 31	+ 7 34 10. 1	Ast Tou +7°2204, 26	4	26	183	B.	
22 4 46. 09	+ 7 41 55. 1	Ast Tou +7°2204, 37	4	26	183	B.	
22 4 41. 24	+ 7 37 57. 6	Ast Tou +7°2204, 33	4	26	183	B.	
22 17 47. 28	+ 5 56 1. 1	Ast Tou +5°2220, 7	4	26	183	B.	
22 39 58. 55	+ 3 28 51. 9	Cinc Pub 18:4, 2960	3	26	183	B.	9.ᵐ4.
22 47 21. 36	+ 2 27 51. 9	AG Albany 7897	3	26	183	B.	Poor transits.
23 1 34. 36	+ 1 21 17. 0	AG Albany 7968; AG Nicolajew 5780	2	26	183	B.	
23 1 44. 71	+ 1 6 6. 5	Ast Alg 0°2304, 10	2	26	183	B.	
23 5 57. 90	+ 0 49 2. 7	Ast Alg 0°2304, 71	2	26	183	B.	
23 6 2. 03	+ 0 48 50. 0	Ast Alg 0°2304, 73	2	26	183	B.	Haze. Star v. ft. last half.
23 9 17. 70	+ 0 22 50. 6	Ast Alg 0°2304, 128; 0°2312, 4	2	26	183	B.	
23 9 35. 18	+ 0 31 2. 0	Ast Alg 0°2304, 132; 0°2312, 5	2	26	183	B.	
23 28 48. 82	− 1 12 12. 4	Ast Alg −1°2324, 91; −2°2328, 35	3	26	183	B.	
23 28 52. 88	− 1 15 45. 2	Ast Alg −1°2324, 92; −2°2328, 36	3	26	183	B.	
23 33 16. 59	− 1 32 11. 8	Ast Alg −1°2332, 68; −2°2328, 76; −2°2336, 2.	3	26	183	B.	
23 33 22. 18	− 1 28 15. 0	Ast Alg −1°2332, 69; −2°2328, 77; −2°2336, 3.	3	26	183	B.	
23 36 36. 60	− 1 46 59. 6	Ast Alg −1°2332, 94; −2°2336, 27; Ast Fer −3°2332, 206.	2	26	183	B.	
23 36 50. 57	− 1 47 54. 7	Ast Alg −1°2332, 97; −2°2336, 32	2	26	183	B.	
23 43 38. 37	− 2 12 45. 7	Ast Alg −2°2344, 62	3	26	183	B.	
23 43 42. 75	− 2 21 36. 5	Ast Fer −3°2340, 186	3	26	183	B.	Wires 10 rev. apart bother in α. Star ft. Haze.
23 54 19. 07	− 3 5 17. 4	Ast Fer −3°2356, 17	3	26	183	B.	Poor obsn.
23 58 8. 80	− 3 11 22. 5	Ast Fer −4°0000, 16	3	26	183	B.	
23 58 14. 68	− 3 14 26. 5	Ast Fer −3°2356, 104; −4°0000, 17	3	26	183	B.	
0 20 17. 85	− 4 10 17. 6	Ast Fer −4°0016, 145; −5°0020, 79	4	26	183	B.	
0 20 40. 26	− 4 12 8. 4	Ast Fer −4°0016, 152; −5°0020, 86	4	26	183	B.	
0 23 4. 18	− 4 23 1. 8	Ast Fer −4°0024, 23; −5°0020, 142	3	26	183	B.	
0 23 49. 04	− 4 21 15. 8	Ast Fer −4°0024, 31; −5°0020, 162	3	26	183	B.	
0 58 21. 52	− 5 5 56. 9	Ast Fer −5°0100, 18; −6°0056, 67	3	26	183	B.	
1 8 17. 66	− 4 53 46. 5	Ast Fer −4°0104, 136; − 5°0108, 44; −6°0104, 109.	2	26	183	B.	
1 8 10. 94	− 5 0 20. 9	Ast Fer −5°0108, 41; −6°0104, 107	2	26	183	B.	
1 33 25. 94	− 4 31 30. 3	Ast Fer −4°0128, 173; −4°0136, 6; −5°0132, 66.	3	26	183	B.	
1 33 46. 63	− 4 43 40. 5	Ast Fer −5°0132, 72	3	26	183	B.	
1 35 53. 23	− 4 40 26. 5	Ast Fer −5°0132, 99	3	26	183	B.	
1 35 50. 04	− 4 37 13. 2	Ast Fer −4°0136, 31; −5°0132, 98	3	26	183	B.	
1 51 45. 20	− 4 5 5. 7	Ast Fer −4°0152, 44; −5°0148, 105	4	26	183	B.	
1 52 26. 46	− 3 59 48. 0	Ast Fer −4°0152, 56	4	26	183	B.	
2 7 17. 27	− 3 30 25. 7	Ast Fer −3°0204, 107; −4°0208, 58	4	26	183	B.	
2 8 7. 32	− 3 34 0. 8	Ast Fer −3°0204, 120; −4°0208, 81	4	26	183	B.	
2 29 38. 12	− 2 23 39. 0	Ast Alg −2°0232, 97; Ast Fer −3°0228, 92.	3	26	183	B.	
2 37 41. 93	− 2 6 27. 8	Ast Alg −2°0232, 177	4	26	183	B.	Ft. Haze. Moonlight.
2 38 1. 49	− 2 1 0. 0	Ast Fer −3°0236, 131	4	26	183	B.	Haze. Moonlight. Asteroid faint.
3 7 54. 17	− 0 20 27. 2	Ast Alg 0°0304, 149; −1°0308, 23	2	26	183	B.	
3 8 16. 53	− 0 22 19. 7	Ast Alg 0°0304, 157; −1°0308, 33	2	26	183	B.	
3 20 2. 90	+ 0 17 4. 9	Ast Alg 0°0320, 34	3	26	183	B.	
3 20 1. 80	+ 0 19 35. 0	Ast Alg 0°0320, 33	3	26	183	B.	Bothered in δ by wires 10 rev. apart.
3 31 55. 15	+ 0 57 22. 2	Ast Alg 0°0328, 36	4	26	183	B.	
3 31 59. 01	+ 0 46 7. 2	Ast Alg 0°0328, 37	4	26	183	B.	
3 39 19. 78	+ 1 17 0. 4	Comp. with AG Nicolajew 800; 804	4	26	183	B.	
4 11 40. 95	+ 2 52 41. 8	Comp. with Abbadia (+4° a′−2°) 2036; 2043; AG Albany 1230; 1234.	3	26	183	B.	

Date	W. M. T.	Apparent Place of Asteroid		Asteroid—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
1908a										
1908	h m s	h m s	° ′ ″	m s	′ ″				s	″
Feb. 1	13 20 20	8 28 29. 51	+31 0 48. 0	−1 50. 09	+ 3 4. 5	t25, 5	9. 337	0. 172	+0. 66	− 3. 3
1908 CG										
1908										
Feb. 24	10 51 35	8 36 44. 38	+17 59 47. 1	+2 25. 04	+11 37. 9	t25, 5	8. 788	0. 495	+0. 62	− 3. 6
28	9 13 53	8 34 59. 90	+18 18 26. 8	+1 19. 12	+ 0 57. 2	t25, 5	9. 027n	0. 494	+0. 61	− 3. 5
Mar. 4	8 52 21	8 33 11. 41	+18 40 8. 0	−1 24. 62	− 0 8. 2	t25, 5	9. 029n	0. 487	+0. 58	− 3. 0
1908 CY										
1908										
May 2	12 27 53	14 8 10. 27	− 9 42 37. 4	+1 7. 68	−10 35. 5	t30, 6	9. 097	0. 815	+1. 21	− 5. 5
1908 DA										
1908										
Apr. 30	12 13 48	13 23 11. 70	− 0 24 51. 4	−0 23. 56	− 3 34. 0	t18, 6	9. 222	0. 744	+1. 10	− 5. 2
May 2	13 18 28	13 21 32. 03	− 0 23 26. 7	−2 3. 24	− 2 9. 4	t20, 4	9. 468	0. 743	+1. 11	− 5. 1
1908 DB										
1908										
Apr. 30	11 13 2	13 19 56. 70	+ 0 50 30. 5	+3 37. 94	+ 0 12. 1	t25, 5	8. 744	0. 732	+1. 09	− 5. 0
1908 EKa										
1908										
Oct. 26	11 4 27	2 39 20. 42	+12 36 57. 4	+2 0. 95	+ 9 28. 8	t24, 5	9. 174n	0. 596	+2. 78	+13. 6
Nov. 2	13 27 10	2 32 32. 66	+11 36 16. 9	+0 58. 02	− 8 22. 2	t55, 11	9. 307	0. 617	+2. 77	+13. 9
12	10 19 38	2 23 13. 92	+10 15 19. 1	+1 56. 59	+ 1 12. 3	t25, 5	8. 864n	0. 624	+2. 87	+14. 5
15	10 12 42	2 20 37. 45	+ 9 52 37. 0	+1 19. 82	+ 1 1. 8	t29, 6	8. 763n	0. 628	+2. 88	+14. 6
18	9 32 52	2 18 11. 98	+ 9 31 31. 0	+2 11. 12	− 3 50. 4	t25, 5	9. 038n	0. 636	+2. 87	+14. 6

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
1908a							
h m s	° ′ ″			in.			
8 30 18. 94	+30 57 46. 8	AG Leiden 3579	--	26	---	Fn.	
1908 CG							
8 34 18. 72	+17 48 12. 8	AG Berlin A 3450	--	26	---	Hd.	$13^m.2$.
8 33 40. 17	+18 17 33. 1	AG Berlin A 3446	--	26	---	Hd.	$13^m.0$.
8 34 35. 45	+18 40 19. 2	AG Berlin A 3455	--	26	---	Hd.	$13^m.5$. V. v. ft.
1908 CY							
14 7 1. 38	− 9 31 56. 4	AG Wien-Ottakring 5029	--	26	---	Fn.	$13^m.5$.
1908 DA							
13 23 34. 16	− 0 21 12. 2	AG Nicolajew 3582	5	26	---	Fn.	$13^m.5$.
13 23 34. 16	− 0 21 12. 2	AG Nicolajew 3582	--	26	---	Fn.	
1908 DB							
13 16 17. 67	+ 0 50 23. 4	AG Nicolajew 3564	5	26	---	Fn.	$13^m.5$.
1908 EKa							
2 37 16. 69	+12 27 15. 0	AG Leipzig I 789	--	26	---	Hd.	$12^m.5$.
2 31 31. 87	+11 44 25. 2	AG Leipzig I 758	--	26	173	Hl.	V. ft. Haze.
2 21 14. 46	+10 13 52. 3	AG Leipzig II 907	--	26	173	Hd.	$12^m.8$.
2 19 14. 75	+ 9 51 20. 6	AG Leipzig II 892	--	26	173	Hd.	$12^m.8$.
2 15 57. 99	+ 9 35 6. 8	AG Leipzig II 873	4	26	---	Hd.	$12^m.8$.

OBSERVATIONS OF COMETS

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Throughout Part I of this volume the astronomical dates
are used as employed before 1925

Date	W. M. T.	Apparent Place of Comet		Comet—Star		Comp.	Log *pρ*		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
DANIEL (1907 d)										
1908	h m s	h m s	° ′ ″	m s	′ ″				s	″
Feb. 3	17 20 43	15 8 41. 90	− 8 55 2. 9	−2 57. 06	− 3 11. 1	t25, 5	9. 042*n*	0. 810	−0. 83	+ 1. 7
MOREHOUSE (1908 c)										
1908										
Sept. 6	13 24 54	3 6 16. 16	+69 11 15. 6	−2 39. 40	+ 4 13. 0	t25, 5	9. 912*n*	0. 477*n*	+3. 48	− 8. 1
12	8 29 12	2 28 32. 69	+72 37 37. 0	−0 47. 95	+12 42. 7	t6, 2	0. 180*n*	0. 410	+4. 71	− 4. 9
15	8 22 50	1 57 37. 63	+74 23 8. 7	−1 4. 87	− 2 37. 4	t15, 5	0. 230*n*	0. 138	+5. 61	− 2. 2
22	8 54 52	23 59 53. 59	+76 31 38. 3	+10 48. 45	+10 34. 5	t9, 2	0. 140*n*	0. 538*n*	+6. 20	+10. 4
30	13 58 16	21 20 43. 52	+72 15 53. 6	−4 38. 91	+ 4 41. 6	t25, 5	0. 167	9. 633	+2. 90	+21. 4
Oct. 15	8 54 6	19 26 29. 27	+49 47 33. 4	−1 55. 57	− 0 12. 0	t25, 5	9. 708	8. 908*n*	+0. 60	+22. 1
16	11 59 12	19 22 55. 51	+47 47 51. 1	−0 57. 41	+ 0 26. 7	t25, 5	9. 832	0. 611	+0. 56	+21. 7
18	8 50 32	19 17 47. 41	+44 29 48. 1	−1 28. 35	− 4 28. 4	t25, 5	9. 693	9. 932	+0. 54	+21. 0
20	8 25 30	19 13 13. 49	+41 1 24. 6	−0 55. 06	− 4 51. 2	t25, 5	9. 648	0. 037	+0. 53	+20. 0
Nov. 5	8 31 48	18 55 6. 54	+16 41 1. 3	−0 29. 20	− 6 3. 1	t25, 5	9. 649	0. 659	+0. 56	+12. 3
12	7 44 48	18 52 26. 56	+ 8 43 4. 7	+1 4. 25	+ 2 34. 3	t25, 5	9. 622	0. 698	+0. 57	+ 9. 4
15	6 19 46	18 51 45. 39	+ 5 47 13. 6	+1 48. 36	− 2 10. 0	t25, 5	9. 524	0. 699	+0. 58	+ 8. 2
17	7 29 38	18 51 23. 19	+ 3 52 39. 5	+0 16. 81	− 0 7. 1	t18, 6	9. 622	0. 724	+0. 59	+ 7. 5
21	7 16 54	18 50 52. 83	+ 0 26 10. 7	−1 16. 37	− 1 11. 3	t25, 5	9. 624	0. 739	+0. 61	+ 6. 3
25	7 2 58	18 50 34. 39	− 2 41 1. 4	+2 8. 60	− 8 7. 1	t10, 2	9. 626	0. 749	+0. 61	+ 5. 2
27	6 43 49	18 50 28. 29	− 4 7 59. 5	+2 11. 10	+ 2 3. 6	t25, 5	9. 618	0. 755	+0. 62	+ 4. 7
Dec. 2	6 12 36	18 50 18. 40	− 7 30 35. 2	+1 3. 25	− 4 15. 7	t25, 5	9. 609	0. 769	+0. 64	+ 3. 5
3	6 17 33	18 50 17. 26	− 8 9 5. 0	−0 49. 51	+ 2 53. 9	t15, 3	9. 619	0. 768	+0. 66	+ 2. 8

NOTE.—Oct. 20. Sky unusually clear. A rift seemed to be on each side of tail. Two condensations in head. Tail 1½° long.

BORRELLY (1909 a)										
1909										
June 18	15 22 47	1 48 28. 12	+33 15 59. 6	−1 9. 59	− 1 48. 0	t20, 4	9. 709*n*	0. 516	−0. 41	− 6. 9
19	15 14 18	1 51 23. 47	+34 37 36. 2	−2 22. 97	− 2 49. 7	t20, 4	9. 721*n*	0. 516	−0. 41	− 7. 0
20	15 3 49	1 54 22. 97	+35 57 14. 5	+1 14. 67	+ 8 51. 8	t30, 6	9. 734*n*	0. 522	−0. 38	− 7. 2
25	15 6 38	2 10 31. 72	+42 10 3. 1	−1 28. 61	+ 0 2. 8	t29, 6	9. 769*n*	0. 426	−0. 42	− 7. 9
29	15 12 6	2 24 46. 15	+46 34 10. 4	−0 31. 06	− 3 56. 2	t35, 7	9. 797*n*	0. 324	−0. 42	− 8. 4
July 19	14 37 57	3 52 24. 48	+61 47 25. 0	−0 21. 28	− 0 52. 7	t30, 6	9. 980*n*	0. 223	−0. 44	− 8. 6
PERRINE (1909 b)										
1909										
Oct. 7	12 4 55	4 5 56. 01	+54 3 35. 5	−1 3. 29	− 4 48. 1	t12, 4	9. 734*n*	9. 882*n*	+3. 38	+ 0. 9
8	12 25 15	4 12 30. 78	+53 50 41. 4	+1 41. 93	+ 4 51. 4	t20, 6	9. 694*n*	0. 008*n*	+3. 39	+ 0. 9
HALLEY (1909 c)										
1909										
Oct. 9	15 18 33	6 14 41. 15	+17 0 29. 2	+1 50. 05	− 9 10. 1	t5, 3	9. 317*n*	0. 538	+1. 87	+ 5. 2
20	13 40 42	6 6 36. 69	+16 56 56. 7	+2 18. 82	− 2 27. 2	t25, 5	9. 463*n*	0. 565	+2. 24	+ 5. 3
Nov. 19	12 9 31	5 8 23. 65	+16 32 49. 4	−0 44. 56	− 1 41. 8	t25, 5	9. 122*n*	0. 531	+3. 21	+ 8. 1
Dec. 10	8 35 46	3 47 19. 16	+14 52 58. 6	−1 25. 47	− 2 6. 9	t25, 5	9. 357*n*	0. 576	+3. 35	+12. 9
15	8 52 17	3 25 5. 65	+14 10 53. 2	+0 59. 80	+ 7 34. 0	t25, 5	9. 061*n*	0. 568	+3. 28	+14. 1

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
		DANIEL (1907 d)					
h m s	° ′ ″			in.			
15 11 39. 79	− 8 51 53. 5	AG Wien-Ottakring 5336	--	26	---	Fn.	
		MOREHOUSE (1908 c)					
3 8 52. 08	+69 7 10. 7	AG Christiania 559	3	26	---	Fn.	No nucleus visible. V. diffuse.
2 29 15. 93	+72 24 59. 2	Newcomb's Fund Cat. 157	--	26	---	Fn.	Scarcely visible. Sky thick.
1 58 36. 89	+74 25 48. 3	AG Berlin C 290	--	26	---	Fn.	
23 48 58. 94	+76 20 53. 4	AG Kasan 4238	--	26	---	Fn.	Diffuse. Sky thick.
21 25 19. 53	+72 10 50. 6	AG Berlin C 3030	--	26	---	Fn.	Identity of star uncertain. Recorded as B. D.+71°1068.
19 28 24. 24	+49 47 23. 3	AG Bonn 13092	--	26	---	Fn.	
19 23 52. 36	+47 47 2. 7	AG Bonn 12988	--	26	---	Fn.	Moonlight. No tail vis. Condensation seemed to be on following side.
19 19 15. 22	+44 33 55. 5	AG Bonn 12904	--	26	---	Fn.	Visible in 2-in. Hazy. Tail, about 1° long, follows.
19 14 8. 02	+41 5 55. 8	AG Bonn 12801	3	26	---	Fn.	Passed over star, which vitiates obsn.
18 55 35. 18	+16 46 52. 1	AG Berlin A 7138	--	26	---	Hd.	Diffuse. Moonlight.
18 51 21. 74	+ 8 40 21. 0	AG Leipzig II 8912	--	26	173	Hd.	
18 49 56. 45	+ 5 49 15. 4	AG Leipzig II 8891	--	26	173	Hl.	V. diffuse. Poor obsn.
18 51 5. 79	+ 3 52 39. 1	AG Albany 6422	--	26	173	Hl.	V. diffuse. Poor obsn. Clouded over.
18 52 8. 59	+ 0 27 15. 7	AG Nicolajew 4732	--	26	173	Hl.	V. diffuse.
18 48 25. 18	− 2 32 59. 5	AG Straszburg 6360	--	26	173	Hl.	
18 48 16. 57	− 4 10 7. 8	AG Straszburg 6355	--	26	173	Hl.	V. diffuse. Moonlight. Clds.
18 49 14. 51	− 7 26 23. 0	AG Wien-Ottakring 6428	--	26	173	Hl.	V. diffuse. Moonlight.
18 51 6. 11	− 8 12 1. 7	AG Wien-Ottakring 6455	--	26	173	Hl.	V. diffuse. Moonlight. Stopped by haze and cld.
		BORRELLY (1909 a)					
1 49 38. 12	+33 17 54. 5	AG Leiden 707	--	26	---	Fn.	Ft. Dawn.
1 53 46. 85	+34 40 32. 9	AG Leiden 744	--	26	---	Fn.	Ft. Dawn.
1 53 8. 68	+35 48 29. 9	AG Lund 905	--	26	---	Fn.	
2 12 0. 75	+42 10 8. 2	AG Bonn 1952	--	26	---	Fn.	
2 25 17. 63	+46 38 15. 0	AG Bonn 2118	--	26	---	Fn.	
3 52 46. 20	+61 48 26. 3	AG Hels 3297	--	26	---	Fn.	V. v. ft.
		PERRINE (1909 b)					
4 6 55. 92	+54 8 22. 7	AG Harvard 1757	--	26	---	Fn.	
4 10 45. 46	+53 45 49. 1	AG Harvard 1785	--	26	---	Fn.	V. v. ft.
		HALLEY (1909 c)					
6 12 49. 23	+17 9 34. 1	AG Berlin A 2051	--	26	178	Fn.	V. v. ft.
6 4 15. 63	+16 59 18. 6	AG Berlin A 1941	--	26	---	Ep.	
5 9 5. 00	+16 34 23. 1	AG Berlin A 1433	--	26	---	Ep.	
3 48 41. 28	+14 54 52. 6	AG Leipzig I 1132	--	26	---	Ep.	
3 24 2. 57	+14 3 5. 1	AG Leipzig I 1018	--	26	---	Ep.	

HALLEY (1909 c)—Continued

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pp α	Log pp δ	Star to App. Place α	Star to App. Place δ
1910	h m s	h m s	° ′ ″	m s	′ ″				s	″
Jan. 3	8 43 29	2 9 15. 78	+11 8 57. 4	−1 47. 02	+12 28. 8	t25, 5	9. 230	0. 619	−0. 48	− 1. 2
7	7 21 31	1 56 39. 49	+10 34 58. 3	−1 29. 24	− 0 5. 9	t25, 5	8. 806	0. 619	−0. 60	− 1. 9
15	7 31 40	1 34 49. 04	+ 9 36 23. 7	+1 1. 76	+10 1. 0	t30, 6	9. 272	0. 695	−0. 81	− 3. 1
Feb. 7	7 43 15	0 54 30. 50	+ 8 6 18. 8	−2 10. 41	+ 8 26. 0	t25, 5	9. 600	0. 695	−1. 27	− 6. 1
10	7 34 51	0 51 0. 13	+ 8 1 36. 4	+1 1. 27	− 3 20. 1	t25, 5	9. 607	0. 697	−1. 33	− 6. 3
Mar. 3	7 26 33	0 31 57. 99	+ 7 54 58. 0	−1 43. 34	− 3 25. 7	t10, 2	9. 662	0. 729	−1. 55	− 8. 2
4	7 13 24	0 31 12. 27	+ 7 55 23. 8	+3 16. 11	+ 8 11. 3	t20, 4	9. 660	0. 726	−1. 56	− 8. 4
Apr. 9	16 56 27	0 0 1. 64	+ 7 56 5. 7	+2 9. 17	− 2 53. 8	t15, 5	9. 664n	0. 734	−1. 36	− 9. 4
10	17 2 16	23 59 4. 13	+ 7 54 57. 9	+1 11. 64	− 4 1. 6	t15, 5	9. 663n	0. 730	−1. 34	− 9. 4
13	16 36 18	23 56 20. 64	+ 7 51 38. 9	−1 31. 91	− 7 20. 9	t15, 5	9. 664n	0. 734	−1. 28	− 9. 1
13	16 57 10	23 56 19. 82	+ 7 51 37. 5	−1 32. 73	− 7 22. 3	t15, 5	9. 661n	0. 727	−1. 28	− 9. 1
19	16 16 28	23 51 54. 90	+ 7 46 38. 9	+0 54. 53	+ 3 26. 8	t21, 7	9. 663n	0. 731	−1. 15	− 8. 8
19	16 50 34	23 51 54. 19	+ 7 46 38. 1	+0 53. 82	+ 3 26. 0	t15, 5	9. 654n	0. 720	−1. 15	− 8. 8
22	16 11 53	23 50 38. 24	+ 7 46 51. 2	−0 22. 17	+ 3 39. 0	t18, 6	9. 662n	0. 729	−1. 11	− 8. 7
26	16 20 43	23 50 31. 45	+ 7 53 3. 9	+0 8. 57	− 0 6. 7	t9, 3	9. 654n	0. 720	−1. 03	− 8. 4
28	16 20 23	23 51 24. 24	+ 7 59 56. 7	+1 1. 30	+ 6 45. 9	t30, 6	9. 652n	0. 718	−0. 97	− 8. 2
May 4	15 59 21	0 0 0. 24	+ 8 46 38. 5	−0 25. 45	− 0 0. 6	t25, 5	9. 655n	0. 717	−0. 88	− 7. 4
6	16 13 43	0 6 4. 91	+ 9 16 34. 9	+4 34. 74	+ 3 50. 7	t20, 4	9. 648n	0. 709	−0. 85	− 7. 3
12	15 58 47	0 47 36. 91	+12 21 45. 3	+0 45. 92	+ 4 7. 2	t30, 6	9. 666n	0. 713	−0. 90	− 5. 8
15	16 19 42	1 44 8. 38	+15 47 12. 2	+9 20. 35	− 9 41. 8	t5, 1	9. 676n	0. 718	−1. 03	− 4. 4
29	8 43 55	9 35 51. 43	+ 3 34 16. 2	+0 52. 50	− 1 52. 4	t30, 6	9. 567	0. 719	−0. 01	− 0. 9
30	8 32 55	9 46 31. 98	+ 2 56 8. 5	−1 2. 11	+ 3 45. 4	t30, 6	9. 540	0. 721	+0. 05	− 1. 3
June 3	9 40 58	10 4 58. 19	+ 1 11 34. 8	+2 2. 39	− 9 52. 6	t25, 5	9. 620	0. 735	+0. 06	− 1. 8
7	8 46 52	10 16 34. 87	+ 0 8 37. 4	+1 32. 43	− 5 52. 5	t25, 5	9. 563	0. 739	+0. 10	− 2. 3

NOTES.—Apr. 19.8 Ep. Diameter of head at p=0°, 6″.8, 10 settings. Diameter of head at p=265° (axis of tail), 6″.9, 8 settings; probably small on account of twilight. Tail 5 long in 26-in. at p=265°. Jet at p=60°. From center of head to extremity of jet, 14″.1, 6 settings. Apr. 22.7 Ep. Jets at p=153° cause nucleus to appear not central. May 4.7 Ep. Diameter of head at p=260 (axis of tail), 6″.7, 8 settings, bright field. Diameter of head at p=170°, 6″.2, 8 settings, bright field. Tail 14° long at p=260°. Jets at p=109°, 2 estimations. Beginning to have the appearance of an envelope. From center of head to extremity of jets at p=80°, 23″.5, 5 settings. May 6.7 Hl. Much haze. Tail 14° long; shades down very gradually. Could not tell anything about jets or envelopes. May 12.7. Haze and cloud. Head considerably larger. Tail 28° long; appears to have opened out more and to go back less straight than before.

DANIEL (1909 e)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pp α	Log pp δ	Star to App. Place α	Star to App. Place δ
1909										
Dec. 10	9 7 59	6 17 26. 58	+37 10 24. 9	−1 18. 14	− 4 20. 2	t25, 5	9. 688n	0. 342	+4. 20	+ 0. 2
15	12 1 48	6 18 3. 60	+41 12 42. 8	−0 52. 06	− 1 3. 7	t24, 5	9. 017n	9. 496n	+4. 52	+ 0. 3
1910										
Jan. 10	9 9 45	6 18 12. 07	+54 24 41. 6	−0 42. 11	− 0 23. 3	t25, 5	9. 558n	0. 243n	+0. 98	+ 6. 1
15	8 11 38	6 19 55. 71	+55 28 59. 9	−0 33. 87	− 2 2. 0	t29, 6	9. 691n	0. 426	+1. 06	+ 7. 3

1910 a

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pp α	Log pp δ	Star to App. Place α	Star to App. Place δ
1910										
Jan. 25	6 16 22	21 17 36. 47	− 3 15 24. 9	−6 2. 53	+ 1 23. 8	t19, 4	9. 653	0. 745	−1. 90	−10. 7
Feb. 2	6 39 14	21 40 43. 54	+ 3 52 35. 9	−1 53. 18	− 6 25. 6	t13, 3	9. 660	0. 737	−1. 87	−10. 7
4	6 18 19	21 44 37. 44	+ 5 0 2. 7	+0 7. 20	+ 7 27. 5	t30, 7	9. 658	0. 732	−1. 86	−10. 7
Mar. 13	17 4 39	22 25 19. 84	+15 49 17. 1	+5 18. 85	+ 1 3. 3	t5, 1	9. 677n	0. 721	−1. 61	−13. 2
Apr. 9	16 0 42	22 38 47. 71	+21 3 12. 9	+1 18. 40	+ 5 41. 4	t18, 6	9. 686n	0. 680	−1. 25	−14. 2

HALLEY (1909 c)—Continued

Mean Place of Star for Beginning of Year		Authority	Seeing	Inst.	Power	Obsr.	Remarks
α	δ						
h m s	° ′ ″			in.			
2 11 3. 28	+10 56 29. 8	AG Leipzig I 668	--	26	---	Ep.	
1 58 9. 33	+10 35 6. 1	AG Leipzig I 610	3	26	---	Ep.	Star's α somewhat uncertain.
1 33 48. 09	+ 9 26 25. 8	AG Leipzig II 614	--	26	---	Ep.	
0 56 42. 18	+ 7 57 58. 9	AG Leipzig II 355	--	26	---	Ep.	
0 50 0. 19	+ 8 5 2. 8	AG Leipzig II 308	--	26	---	Ep.	
0 33 42. 88	+ 7 58 31. 9	AG Leipzig II 197	--	26	---	Ep.	
0 27 57. 72	+ 7 47 20. 9	AG Leipzig II 161	--	26	---	Ep.	
23 57 53. 83	+ 7 59 8. 9	AG Leipzig II 11861	--	26	---	Ep.	No tail.
23 57 53. 83	+ 7 59 8. 9	AG Leipzig II 11861	--	26	---	Ep.	
23 57 53. 83	+ 7 59 8. 9	AG Leipzig II 11861	--	26	---	Ep.	
23 57 53. 83	+ 7 59 8. 9	AG Leipzig II 11861	--	26	---	Ep.	Tail and jets.
23 51 1. 52	+ 7 43 20. 9	AG Leipzig II 11818	--	26	---	Ep.	
23 51 1. 52	+ 7 43 20. 9	AG Leipzig II 11818	--	26	---	Ep.	5½^{m}.
23 51 1. 52	+ 7 43 20. 9	AG Leipzig II 11818	4	26	---	Ep.	Haze.
23 50 23. 91	+ 7 53 19. 0	AG Leipzig II 11813	--	26	---	Ep.	Stopped by clds.
23 50 23. 91	+ 7 53 19. 0	AG Leipzig II 11813	--	12	---	Ep.	Clds. No tail. Jets appeared symmetrical.
0 0 26. 57	+ 8 46 46. 5	AG Leipzig II 11870	--	26	---	Ep.	Nucleus 2½^{m}. Total brightness 1^{m}.
0 1 31. 02	+ 9 12 51. 5	AG Leipzig II 11874	--	26	178	Hl.	Too much daylight to finish.
0 46 51. 89	+12 17 43. 9	AG Leipzig I 231	4	26	178	Hl.	Haze.
1 34 49. 06	+15 56 58. 4	AG Berlin A 473	--	26	178	Hl.	Too much daylight to finish.
9 34 58. 94	+ 3 36 9. 5	AG Albany 3837	4	26	178	Hl.	Star v. ft. at times. Clds.
9 47 34. 04	+ 2 52 24. 4	AG Albany 3893	--	26	178	Hl.	Seeing steady. Clds interrupted.
10 2 55. 74	+ 1 21 29. 2	AG Albany 3961	3	26	178	Hl.	
10 15 2. 34	+ 0 14 32. 2	AG Nicolajew 3035	3	26	178	Hl.	Plainly vis. to naked eye. Tail 3° long, as seen from inside dome.

May 15.7. Tail 60° long; against dark sky before rising of head. May 16.7. Tail 60° long before rising of head. May 18.6–18.7. Looked for meteor showers, Hall with 26-in., and 5-in. and 2-in. finders, and through slit of large dome; Morgan from ground; Burton and Naulte from top of main building, where city lights interfered. Watched till comet faded out in dawn at 3.30 a. m. Tail 115° long. Evidently Earth had not yet gone through principal part of tail. May 27.3 Bn. Head appears to be one-fifth of distance from θ Hydræ to α Leonis on the line joining them. The tail extends toward Spica as far as line joining η Virginis and γ Corvi. The upper edge passes halfway between ν Leonis and ε Leonis; the lower edge passes as far below φ Leonis as upper edge above ε Leonis. Tail 45° long.

DANIEL (1909 e)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
6 18 40. 52	+37 14 44. 9	AG Lund 3275	--	26	---	Ep.	
6 18 51. 14	+41 13 46. 2	AG Bonn 5230	--	26	---	Ep.	
6 18 53. 20	+54 24 58. 8	AG Harvard 2497	--	26	---	Ep.	
6 20 28. 52	+55 30 54. 6	AG Hels 4508	--	26	---	Ep.	Barely visible in 5-in.

1910 a

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
21 23 40. 90	− 3 16 38. 0	AG Straszburg 7499	3	12	---	Ep.	
21 42 38. 59	+ 3 59 12. 2	AG Albany 7600	--	12	---	Ep.	
21 44 32. 10	+ 4 52 45. 9	AG Albany 7614	--	12	---	Ep.	
22 20 2. 60	+15 48 27. 0	AG Berlin A 9149	--	12	---	Ep.	
22 37 30. 56	+20 57 45. 7	AG Berlin B 8719	2	26	---	Ep.	V. ft.

Date	W. M. T.	Apparent Place of Comet		Comet—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
METCALF (1910 b)										
1910	h m s	h m s	° ′ ″	m s	′ ″				s	″
Aug. 10	12 4 47	16 10 29. 33	+14 56 40. 4	−1 0. 71	+ 2 33. 2	t30, 6	9. 664	0. 692	+1. 43	+ 2. 4
18	9 29 4	15 55 3. 67	+15 49 12. 2	−1 12. 90	+ 1 0. 8	t25, 5	9. 562	0. 612	+1. 25	+ 2. 9
23	8 29 11	15 47 36. 45	+16 12 41. 0	−1 9. 89	+ 0 2. 8	t25, 5	9. 502	0. 586	+1. 12	+ 2. 9
30	8 1 2	15 39 31. 43	+16 37 56. 7	−0 51. 98	− 9 43. 8	t24, 5	9. 518	0. 585	+0. 97	+ 3. 1
Sept. 26	8 3 29	15 26 13. 99	+17 46 27. 4	−0 28. 75	+ 1 36. 8	t25, 5	9. 665	0. 669	+0. 49	+ 1. 3
28	6 59 22	15 26 1. 81	+17 51 45. 6	−0 42. 84	− 3 30. 0	t25, 5	9. 620	0. 622	+0. 47	+ 1. 0
D'ARREST (1910 c)										
1910										
Aug. 30	9 26 25	16 59 20. 78	−11 55 28. 4	−4 4. 90	− 0 26. 5	t25, 5	9. 520	0. 805	+1. 60	− 4. 2
FAYE (1910 e)										
1910										
Nov. 11	8 47 5	3 38 26. 95	+ 8 9 16. 7	−1 44. 28	+ 6 45. 7	t30, 6	9. 564n	0. 686	+3. 17	+16. 8
20	7 22 41	3 37 31. 22	+ 6 7 16. 9	+2 33. 78	− 3 22. 7	t25, 5	9. 618n	0. 712	+3. 26	+16. 5
30	8 20 47	3 36 42. 34	+ 4 24 14. 4	+0 5. 66	+ 3 22. 0	t30, 8	9. 469n	0. 706	+3. 31	+15. 6
Dec. 8	10 53 53	3 37 5. 46	+ 3 32 47. 6	+2 14. 25	+ 2 32. 8	t25, 5	8. 696	0. 705	+3. 36	+15. 1
20	9 47 35	3 40 24. 03	+ 3 7 56. 3	+1 9. 56	− 1 55. 3	t25, 5	7. 681	0. 709	+3. 40	+14. 0
1911										
Jan. 28	7 34 14	4 15 43. 46	+ 6 18 2. 9	+0 29. 07	− 0 52. 1	t30, 6	8. 412n	0. 673	+0. 18	+ 1. 4
Feb. 4	7 32 18	4 25 20. 10	+ 7 10 26. 5	−1 0. 63	+ 2 0. 4	t30, 6	7. 804	0. 663	+0. 13	+ 1. 6
KIESS (1911 b)										
1911										
July 9	14 47 44	4 46 51. 13	+34 50 54. 6	+3 27. 71	+ 0 6. 1	t25, 5	9. 735n	0. 730	−0. 14	+ 4. 0
12	15 3 2	4 41 35. 20	+34 19 20. 5	−1 15. 11	− 1 10. 3	t25, 5	9. 742n	0. 685	−0. 03	+ 4. 2
18	15 21 33	4 30 49. 04	+32 54 28. 5	−3 32. 32	− 3 14. 9	t25, 5	9. 731n	0. 608	+0. 16	+ 4. 5
Aug. 9	16 0 52	3 8 43. 63	+11 41 40. 2	+3 20. 98	− 1 35. 5	t25, 5	9. 358n	0. 620	+1. 32	+13. 4
BROOKS (1911 c)										
1911										
July 24	13 49 31	22 10 22. 08	+23 14 52. 8	+2 2. 90	− 4 20. 7	t25, 5	8. 462n	0. 371	+2. 13	+ 3. 1
31	13 46 24	22 1 46. 63	+27 30 59. 7	−0 6. 06	− 1 28. 6	d9, 8	8. 646	0. 236	+2. 24	+ 4. 0
Aug. 9	10 6 28	21 43 57. 85	+33 51 59. 0	+1 16. 10	+ 0 10. 5	t25, 5	9. 519n	0. 179	+2. 39	+ 5. 7
Sept. 1	10 53 0	19 36 59. 64	+53 23 32. 9	−0 9. 53	− 0 48. 6	t29, 6	9. 573	0. 183n	+1. 98	+11. 7
13	11 30 2	17 10 57. 07	+57 6 38. 8	+0 6. 31	−13 10. 4	t12, 4	9. 924	0. 426	+0. 65	+10. 0
18	10 49 1	16 7 36. 81	+55 10 0. 2	−8 7. 74	+ 2 54. 0	t15, 3	9. 900	0. 586	+0. 30	+ 6. 9
26	8 26 6	14 45 18. 81	+48 34 54. 1	−0 52. 28	− 1 12. 8	t25, 5	9. 840	0. 560	+0. 12	+ 0. 4
Oct. 23	17 46 40	12 35 44. 21	+11 18 23. 3	−1 57. 54	− 3 45. 1	t25, 5	9. 643n	0. 694	+0. 75	− 8. 0
QUÉNISSET (1911 f)										
1911										
Sept. 25	9 25 12	14 45 22. 14	+70 36 12. 8	−4 49. 56	+ 3 59. 5	t20, 4	0. 126	0. 527	−1. 42	+ 0. 5
26	9 10 25	14 52 5. 33	+68 32 38. 2	−2 11. 15	− 3 8. 1	t25, 5	0. 091	0. 484	−1. 20	+ 0. 7
29	8 44 55	15 6 39. 64	+62 20 51. 1	−0 8. 67	+ 2 13. 6	t20, 4	9. 993	0. 446	−0. 66	+ 0. 9
Oct. 16	7 55 2	15 37 5. 63	+32 21 13. 5	−0 58. 40	+12 50. 9	t30, 8	9. 733	0. 660	+0. 34	− 2. 2

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
METCALF (1910 b)							
h m s	° ′ ″			in.			
16 11 28. 61	+14 54 4. 8	AG Leipzig I 5661; AG Berlin A 5818	--	26	---	Bn.	V. ft.
15 56 15. 32	+15 48 8. 5	AG Berlin A 5725	--	26	---	Ep.	
15 48 45. 22	+16 12 35. 3	AG Berlin A 5675	5	12	---	Ep.	V. ft. Thick haze. Poor obsn.
15 40 22. 44	+16 47 37. 4	AG Berlin A 5632	--	26	---	Ep.	
15 26 42. 25	+17 44 49. 3	AG Berlin A 5564	--	26	---	Bn.	Visible in 5-in.
15 26 44. 18	+17 55 14. 6	AG Berlin A 5565	--	26	---	Ep.	
D'ARREST (1910 c)							
17 3 24. 08	−11 54 57. 7	Radcliffe 4456	--	26	---	Ep.	V. v. ft. Poor obsn.
FAYE (1910 e)							
3 40 8. 06	+ 8 2 14. 2	AG Leipzig II 1377	4	12	---	Ep.	
3 34 54. 18	+ 6 10 23. 1	AG Leipzig II 1345	--	12	---	Ep.	
3 36 33. 37	+ 4 20 36. 8	AG Albany 1077	3	12	---	Ep.	
3 34 47. 85	+ 3 29 59. 7	AG Albany 1062	2	12	---	Ep.	
3 39 11. 07	+ 3 9 37. 6	AG Albany 1090	--	12	---	Ep.	Ft.
4 15 14. 21	+ 6 18 53. 6	AG Leipzig II 1591	--	26	---	Ep.	
4 26 20. 60	+ 7 8 24. 5	AG Leipzig II 1657	--	26	---	Ep.	Poor obsn.
KIESS (1911 b)							
4 43 23. 56	+34 50 44. 5	AG Leiden 1778	--	26	---	Ep.	
4 42 50. 34	+34 20 26. 6	AG Leiden 1775	--	26	---	Ep.	V. diffuse. Haze.
4 34 21. 20	+32 57 38. 9	AG Leiden 1747	--	26	---	Bn.	
3 5 21. 33	+11 43 2. 3	AG Leipzig I 948	--	26	---	Ep.	Ft. V. diffuse.
BROOKS (1911 c)							
22 8 17. 05	+23 19 10. 4	AG Berlin B 8559	--	26	---	Bn.	
22 1 50. 45	+27 32 24. 3	AG Cambridge 13179	--	26	---	Ep.	
21 42 39. 36	+33 51 42. 8	AG Leiden 9120	--	26	---	Ep.	Ft. Moonlight.
19 37 7. 19	+53 24 9. 8	AG Harvard 6130	--	12	---	Ep.	Easily visible to naked eye.
17 10 50. 11	+57 19 39. 2	AG Hels 9172	--	26	---	Ep.	Nucleus well defined.
16 15 44. 25	+55 6 59. 3	AG Hels 8737	--	26	---	Ep.	
14 46 10. 97	+48 36 6. 5	AG Bonn 9627	--	26	---	Ep.	
12 37 41. 00	+11 22 16. 4	AG Leipzig I 4651	--	26	---	Bn.	Star v. ft. in last transits.
QUÉNISSET (1911 f)							
14 50 13. 12	+70 32 12. 8	AG Berlin C 2011	--	26	---	Ep.	
14 54 17. 68	+68 35 45. 6	AG Christiania 2227	--	26	---	Ep.	
15 6 48. 97	+62 18 36. 6	Comp. with AG Hels 8270	--	26	---	Ep.	
15 38 3. 69	+32 8 24. 8	AG Leiden 5560	2	12	160	Bn.	

Date	W. M. T.	Apparent Place of Comet		Comet—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
BELJAWSKY (1911 g)										
1911	h m s	h m s	° ′ ″	m s	′ ″				s	″
Sept. 30	16 55 39	11 5 46. 13	+ 9 51 0. 4	+2 16. 26	+ 0 10. 8	t5, 1	9. 664n	0. 723	+0. 67	− 2. 2
Oct. 4	17 1 11	11 53 53. 35	+12 0 42. 4	+9 13. 51	− 4 15. 8	t5, 1	9. 670n	0. 731	+0. 65	− 4. 1
GALE (1912 a)										
1912										
Sept. 28	7 8 47	15 10 58. 10	− 9 30 48. 4	−2 48. 96	− 2 52. 6	t25, 5	9. 630	0. 768	+1. 12	− 9. 9
30	7 18 39	15 16 51. 11	− 6 49 25. 5	−0 54. 83	+10 13. 4	t24, 8	9. 636	0. 759	+1. 11	− 9. 2
Oct. 4	7 11 5	15 26 57. 29	− 1 42 22. 1	+3 0. 91	+ 0 27. 6	t25, 5	9. 631	0. 746	+1. 11	− 8. 2
12	6 55 5	15 41 56. 52	+ 7 26 30. 8	+3 22. 07	+16 47. 6	t5, 1	9. 635	0. 711	+1. 01	− 6. 7
15	7 26 57	15 46 9. 74	+10 28 43. 3	+1 6. 32	+ 3 20. 5	t30, 6	9. 660	0. 714	+0. 98	− 6. 2
26	6 18 59	15 57 53. 38	+20 9 6. 6	−0 51. 23	+ 3 54. 2	t15, 5	9. 661	0. 640	+0. 78	− 6. 1
1913										
Jan. 9	6 37 47	18 12 25. 76	+75 40 6. 8	+2 21. 36	+ 2 16. 2	t25, 5	0. 223	0. 622	−5. 37	−14. 4
14	7 36 44	18 55 34. 47	+79 31 39. 6	+5 19. 90	− 5 56. 0	t25, 5	0. 318	0. 680	−8. 12	−12. 5
Mar. 5	10 25 19	4 55 6. 42	+65 8 24. 7	+2 34. 44	− 5 51. 3	t25, 5	9. 996	9. 374n	+0. 56	+24. 0
28	9 38 35	5 37 8. 78	+56 56 14. 6	−2 21. 06	+ 2 33. 4	t25, 5	9. 885	9. 837	+0. 49	+20. 8
Apr. 5	9 36 4	5 49 36. 93	+54 43 32. 4	+1 0. 03	− 6 22. 2	t30, 6	9. 873	0. 113	+0. 36	+19. 9
TUTTLE (1912 b)										
1912										
Nov. 9	17 30 52	11 3 37. 03	−25 7 49. 5	−2 11. 53	−0 3. 0	t25, 5	9. 450n	0. 869	+1. 33	− 0. 4
BORRELLY (1912 c)										
1912										
Nov. 5	6 28 19	18 12 17. 26	+33 41 32. 5	+1 12. 68	− 4 7. 1	t30, 6	9. 617	0. 316	+0. 56	+ 4. 6
8	6 55 32	18 32 15. 29	+28 50 31. 0	−1 33. 95	− 8 26. 3	t25, 5	9. 623	0. 456	+0. 77	+ 5. 6
16	8 6 55	19 11 58. 26	+17 31 44. 6	+0 42. 06	− 2 3. 9	t12, 4	9. 652	0. 655	+1. 20	+ 5. 7
SCHAUMASSE (1913 a)										
1913										
May 8	14 7 29	20 47 24. 76	+11 47 17. 0	+1 20. 97	+ 1 56. 0	t30, 6	9. 574n	0. 658	+1. 05	−11. 7
24	13 31 5	19 0 45. 09	+31 31 17. 4	+1 6. 53	− 1 51. 6	t30, 6	9. 267n	0. 121	+1. 99	−16. 3
28	13 20 16	18 11 11. 83	+36 39 47. 0	−1 8. 20	− 4 30. 5	t30, 6	8. 813n	9. 536	+2. 32	−15. 9
June 2	11 21 41	16 59 13. 31	+40 46 1. 3	+1 9. 80	−11 45. 7	t30, 6	9. 144n	9. 281n	+2. 72	−12. 7
9	12 23 33	15 20 55. 98	+41 0 34. 1	−2 32. 12	+ 6 51. 5	t30, 6	9. 526	9. 605	+2. 85	− 7. 0
29	9 29 10	13 10 28. 02	+30 19 50. 5	+0 51. 38	+ 5 29. 5	t30, 6	9. 551	0. 339	+2. 03	− 1. 2
METCALF (1913 b)										
1913										
Sept. 4	13 0 13	6 46 36. 75	+58 5 55. 0	−4 20. 58	+ 5 23. 3	t25, 5	9. 926n	0. 623	+2. 66	− 3. 3
9	15 17 46	6 35 41. 28	+61 19 22. 8	−1 12. 58	− 0 56. 3	t30, 10	9. 920n	9. 483n	+3. 19	− 4. 4
Oct. 4	13 6 18	22 27 7. 56	+66 17 40. 1	+0 50. 02	− 3 48. 1	t18, 6	9. 959	0. 193n	+2. 68	+24. 0
28	8 28 28	20 47 44. 63	+ 6 54 1. 3	−0 45. 54	− 5 46. 8	t30, 6	9. 387	0. 678	+2. 54	+13. 4
Nov. 2	8 39 17	20 45 53. 45	+ 0 54 51. 9	+1 38. 47	− 1 50. 7	t30, 6	9. 469	0. 733	+2. 60	+11. 1

BELJAWSKY (1911 g)

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
11 3 29. 20	+ 9 50 51. 8	Comp. with AG Leipzig I 4192	--	26	---	Ep.	Clds.
11 44 39. 19	+12 5 2. 3	Comp. with AG Leipzig I 4401	--	26	---	Ep.	

GALE (1912 a)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
15 13 45. 94	− 9 27 45. 9	AG Wien-Ottakring 5345	2	12	115	Ws.	Comet bright. No nucleus.
15 17 44. 83	− 6 59 29. 7	AG Wien-Ottakring 5368	3	12	235	Ws.	Nucleus visible at first. Ft. tail.
15 23 55. 27	− 1 42 41. 5	AG Nicolajew 3937	3	12	115	Ws.	Nucleus fairly bright. Ft. tail. Haze.
15 38 33. 44	+ 7 9 49. 9	AG Leipzig II 7056	3	12	115	Ws.	Nucleus small, bright. Ft. tail. Clouded.
15 45 2. 44	+10 25 29. 0	AG Leipzig I 5507	2	12	115	Ws.	Nucleus bright. Ft. tail, apparently double.
15 58 43. 83	+20 5 18. 5	AG Berlin B 5492	4	12	235	Ws.	Windy.
18 10 9. 77	+75 38 5. 0	AG Kasan 3047	3	26	183	Bn.	
18 50 22. 69	+79 37 48. 1	AG Kasan 3187	3	26	183	Bn.	Visible in 5-inch.
4 52 31. 42	+65 13 52. 0	AG Christiania 809	3	26	183	Bn.	
5 39 29. 35	+56 53 20. 4	PGC Boss 1412	2	26	183	Bn.	
5 48 36. 54	+54 49 34. 7	AG Harvard 2337	3	26	183	Bn.	Ft.

TUTTLE (1912 b)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
11 5 47. 23	−25 7 46. 1	Cordoba A 8666	3	26	183	Bn.	

BORRELLY (1912 c)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
18 11 4. 02	+33 45 35. 0	AG Leiden 6563	3	12	115	Ws.	Visible in 4-in. No nucleus or tail. Haze.
18 33 48. 47	+28 58 51. 7	AG Cambridge 9077	3	12	115	Ws.	Clds.
19 11 15. 00	+17 33 42. 8	AG Berlin A 7329	3	12	235	Ws.	V. ft. Haze. Bright moonlight. Went out.

SCHAUMASSE (1913 a)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
20 46 2. 74	+11 45 32. 7	AG Leipzig I 8167	--	26	183	Ws.	Ft. No nucleus. Haze.
18 59 36. 57	+31 33 25. 3	AG Leiden 7058	3	26	183	Ws.	9½ᵐ. Nucleus.
18 12 17. 71	+36 44 33. 4	AG Lund 7581	3	26	183	Ws.	Brt. nucleus.
16 58 0. 79	+40 57 59. 7	AG Bonn 10889	2	26	183	Ws.	Brt. nucleus.
15 23 25. 25	+40 53 49. 6	AG Bonn 9957	3	26	183	Ws.	Brt. nucleus.
13 9 34. 61	+30 14 22. 2	AG Leiden 4853	2	26	183	Ws.	

METCALF (1913 b)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
6 50 54. 67	+58 0 35. 0	AG Hels 4813	--	26	183	Ws.	V. ft. nucleus.
6 36 50. 67	+61 20 23. 5	AG Hels 4674	4	26	388	Ws.	
22 26 14. 86	+66 21 4. 2	AG Christiania 3598	4	26	388	Ws.	
20 48 27. 63	+ 6 59 34. 7	AG Leipzig II 10426	3	26	183	Ws.	V. ft. at times. Clds.
20 44 12. 38	+ 0 56 31. 5	AG Nicolajew 5277	3	26	183	Ws.	Ft. Diffuse.

Date	W. M. T.	Apparent Place of Comet		Comet—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
NEUJMIN (1913 c)										
1913	h m s	h m s	° ′ ″	m s	′ ″				s	″
Sept. 9	13 15 27	23 48 1. 55	+ 0 59 21. 6	+0 19. 33	− 2 11. 8	t30, 10	8. 922	0. 731	+3. 48	+22. 1
22	11 23 3	23 39 51. 90	+ 6 18 39. 8	+1 7. 95	− 1 29. 6	t30, 10	8. 349*n*	0. 673	+3. 51	+22. 5
23	11 16 34	23 39 17. 10	+ 6 40 18. 6	−1 8. 93	− 2 36. 4	t30, 10	8. 420*n*	0. 669	+3. 52	+22. 7
24	11 28 47	23 38 42. 60	+ 7 1 45. 9	−0 30. 36	− 2 52. 4	t30, 10	7. 865	0. 664	+3. 52	+22. 8
Oct. 22	10 29 0	23 33 40. 83	+14 1 33. 0	+0 53. 47	+ 2 49. 4	t30, 10	9. 080	0. 572	+3. 41	+25. 3
WESTPHAL (1913 d)										
1913										
Sept. 27	12 9 6	21 50 37. 66	− 1 37 32. 7	+2 58. 76	+ 3 46. 5	t30, 6	9. 477	0. 752	+3. 40	+15. 5
Oct. 4	9 48 58	21 29 24. 93	+ 4 17 30. 6	+0 33. 23	+ 6 36. 3	t30, 10	9. 153	0. 698	+3. 14	+15. 7
GIACOBINI (1913 e)										
1913										
Oct. 26	7 59 28	18 56 28. 12	− 7 26 49. 8	+0 38. 19	+ 3 26. 6	t24, 8	9. 551	0. 779	+2. 27	− 0. 6
Nov. 1	8 6 50	19 27 13. 67	−13 13 55. 1	+1 8. 64	− 4 4. 2	t30, 6	9. 560	0. 803	+2. 48	− 0. 1
4	7 27 52	19 44 6. 48	−16 13 42. 1	−2 28. 57	− 8 17. 1	t25, 5	9. 482	0. 830	+2. 64	+ 0. 4
6	7 28 42	19 56 6. 24	−18 15 47. 0	+2 1. 32	− 4 4. 4	t30, 6	9. 479	0. 839	+2. 70	+ 0. 2
DELAVAN (1913 f)										
1913										
Dec. 18	8 35 47	3 2 26. 93	− 7 19 57. 1	−3 58. 67	+ 3 15. 1	t25, 5	8. 886*n*	0. 800	+4. 13	+19. 1
19	7 10 56	3 1 37. 21	− 7 14 30. 9	+1 27. 17	− 2 47. 7	t25, 5	9. 358*n*	0. 793	+4. 10	+19. 2
22	7 42 29	2 59 1. 69	− 6 56 9. 0	+1 6. 77	− 6 28. 4	t25, 5	9. 157*n*	0. 795	+4. 07	+18. 9
26	8 59 36	2 55 45. 66	− 6 29 36. 9	+3 23. 70	+ 6 17. 6	t10, 2	8. 676	0. 795	+4. 04	+18. 6
27	7 59 4	2 55 1. 50	− 6 23 2. 8	−0 55. 77	+ 2 4. 9	t25, 5	8. 811*n*	0. 794	+4. 06	+18. 5
29	7 50 26	2 53 32. 35	− 6 8 54. 4	+1 5. 68	− 7 59. 6	t30, 6	8. 801*n*	0. 792	+4. 04	+18. 6
1914										
Jan. 5	8 8 12	2 48 50. 73	− 5 15 35. 4	+4 44. 78	+ 1 4. 1	t25, 5	8. 568	0. 785	+0. 94	+ 3. 2
11	7 32 51	2 45 31. 99	− 4 26 3. 0	+0 46. 94	+ 8 49. 5	t30, 6	8. 301	0. 779	+0. 90	+ 2. 9
18	7 40 55	2 42 29. 03	− 3 23 50. 1	−4 34. 14	− 2 47. 8	t25, 5	8. 985	0. 770	+0. 81	+ 2. 9
21	7 29 38	2 41 27. 34	− 2 56 7. 4	−1 47. 70	+ 0 21. 6	t30, 6	8. 998	0. 766	+0. 76	+ 2. 7
Mar. 3	8 34 57	2 43 17. 43	+ 4 9 1. 5	−3 25. 28	+ 3 46. 3	t25, 5	9. 631	0. 725	+0. 18	+ 3. 5
14	7 46 20	2 48 9. 96	+ 6 11 1. 6	+1 48. 90	+ 1 38. 1	t30, 6	9. 624	0. 714	+0. 04	+ 4. 1

NEUJMIN (1913 c)

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
23 47 38. 74	+ 1 1 11. 3	AG Nicolajew 5900	3	26	388	Bn.	Brt. nucleus. Ft. nebulosity following.
23 38 40. 44	+ 6 19 46. 9	AG Leipzig II 11744	3	26	388	Bn.	Brt. nucleus. Ft. nebulosity.
23 40 22. 51	+ 6 42 32. 3	AG Leipzig II 11756	1	26	388	Bn.	Brt. nucleus. Ft. nebulosity.
23 39 9. 44	+ 7 4 15. 5	AG Leipzig II 11746	2	26	388	Bn.	Brt nucleus. Ft. nebulosity.
23 32 43. 95	+13 58 18. 3	AG Leipzig I 9376	3	26	388	Ws.	V. ft. Only nucleus visible.

WESTPHAL (1913 d)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
21 47 35. 50	− 1 41 34. 7	AG Nicolajew 5523	--	26	183	Bn.	Visible in 2-in. Brt. nucleus.
21 28 48. 56	+ 4 10 38. 6	AG Albany 7535	4	26	388	Ws.	

GIACOBINI (1913 e)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
18 55 47. 66	− 7 30 15. 8	AG Wien-Ottakring 6499	4	26	388	Ws.	V. diffuse. Short tail. Clds.
19 26 2. 55	−13 9 50. 8	AG Harvard 6830	4	26	183	Ws.	
19 46 32. 41	−16 5 25. 4	AG Washington 7462	4	26	183	Ws.	V. ft. V. diffuse. Moonlight.
19 54 2. 22	−18 11 42. 8	Comp. with AG Washington 7496	3	26	183	Ws.	Rather ft. Nucleus not visible. Moonlight.

DELAVAN (1913 f)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
3 6 21. 47	− 7 23 31. 3	AG Wien-Ottakring 728	2	26	183	Bn.	Visible in 5-in. Brt. nebulosity.
3 0 5. 94	− 7 12 2. 4	AG Wien-Ottakring 696	2	26	183	Bn.	Visible in 5-in. Fairly brt. nucleus surrounded by nebulosity. Trace of tail following.
2 57 50. 85	− 6 49 59. 5	AG Wien-Ottakring 685	3	26	183	Bn.	Ft. nucleus and nebulosity. No tail. Haze.
2 52 17. 92	− 6 36 13. 1	AG Wien-Ottakring 662	4	26	183	Bn.	Vis. in 5-in. Fairly brt. nucleus and nebulosity. No tail. Clds.
2 55 53. 21	− 6 25 26. 2	AG Wien-Ottakring 677	2	26	183	Bn.	Visible in 5-in. Fairly brt. nucleus and nebulosity.
2 52 22. 63	− 6 1 13. 4	AG Wien-Ottakring 664	2	26	183	Bn.	Visible in 5-in. Fairly brt. nucleus and nebulosity.
2 44 5. 01	− 5 16 42. 7	AG Straszburg 675	3	26	183	Bn.	Not visible in 5-in. Fairly brt. nucleus and nebulosity. Moonlight.
2 44 44. 15	− 4 34 55. 4	AG Straszburg 678	2	26	183	Bn.	Not visible in 5-in. Ft. nucleus with ft. nebulosity. Moonlight.
2 47 2. 36	− 3 21 5. 2	AG Straszburg 684	3	26	183	Bn.	Visible in 5-in. Fairly brt. nucleus and ft. nebulosity. Haze.
2 43 14. 28	− 2 56 31. 7	AG Straszburg 671	4	26	183	Bn.	Visible in 5-in. Fairly brt. nucleus and nebulosity. Trace of tail following.
2 46 42. 53	+ 4 5 11. 7	AG Albany 792	4	26	183	Bn.	Ft. Moonlight.
2 46 21. 02	+ 6 9 19. 4	AG Leipzig II 1050	4	26	183	Bn.	V. ft. at times. Thin clds. and haze.

Date	W. M. T.	Apparent Place of Comet		Comet—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
DELAVAN (1913 f)—Continued										
1914	h m s	h m s	° ′ ″	m s	′ ″				s	″
Mar. 20	7 27 9	2 51 28. 73	+ 7 18 31. 3	−1 1. 58	+ 0 0. 3	t30, 6	9. 626	0. 708	+0. 03	+ 4. 5
24	7 29 43	2 53 56. 14	+ 8 4 4. 2	+2 18. 61	+ 1 46. 5	t30, 6	9. 639	0. 710	−0. 02	+ 4. 7
July 28	15 39 42	5 54 24. 23	+37 46 57. 1	−0 36. 57	+ 2 55. 2	t18, 6	9. 762n	0. 619	+1. 56	+ 5. 5
Aug. 15	15 2 38	6 56 51. 18	+43 52 27. 8	+1 28. 21	+ 3 1. 1	t20, 4	9. 801n	0. 638	+2. 04	+ 1. 2
Sept. 9	15 27 47	9 19 46. 22	+49 56 42. 1	−1 21. 64	− 7 4. 7	t25, 5	9. 846n	0. 643	+2. 19	− 8. 4
17	16 24 30	10 20 19. 18	+49 30 26. 7	+1 42. 16	− 1 19. 5	t25, 5	9. 847n	0. 579	+2. 03	−11. 3
26	16 52 11	11 28 46. 80	+46 45 10. 4	+3 28. 53	+ 1 27. 9	t25, 5	9. 823n	0. 612	+1. 72	−13. 5
Oct. 2	17 7 24	12 10 53. 14	+43 38 52. 6	−1 34. 31	+ 5 12. 4	t25, 5	9. 799n	0. 639	+1. 52	−14. 1
23	7 0 10	14 0 16. 13	+28 45 59. 3	+2 48. 27	− 3 15. 9	t25, 5	9. 699	0. 760	+1. 36	−14. 7
30	6 42 24	14 26 41. 00	+23 24 44. 1	−2 36. 32	+ 6 7. 8	t15, 3	9. 687	0. 750	+1. 39	−14. 6
31	6 25 27	14 30 5. 71	+22 40 20. 6	+1 25. 96	+ 2 19. 1	t35, 7	9. 690	0. 737	+1. 41	−14. 8
1915										
Jan. 20	18 0 54	17 12 0. 05	−17 28 48. 8	+4 28. 13	+ 1 23. 4	t25, 5	9. 552n	0. 821	−0. 20	− 8. 5
KRITZINGER (1914 a)										
1914										
Mar. 30	14 47 8	16 15 22. 88	− 8 53 7. 8	+1 9. 02	− 1 11. 8	t30, 6	9. 055n	0. 810	+1. 79	−16. 8
Apr. 3	14 46 45	16 28 6. 89	− 6 36 8. 3	−1 39. 43	+ 3 8. 4	t30, 6	9. 033n	0. 794	+1. 85	−17. 2
17	15 19 27	17 18 48. 10	+ 4 7 16. 4	+1 36. 19	− 7 58. 9	t30, 6	8. 529n	0. 698	+1. 97	−18. 6
21	12 50 29	17 34 39. 13	+ 7 47 20. 0	−1 10. 42	− 3 12. 8	t30, 6	9. 486n	0. 677	+1. 95	−18. 8
May 17	12 53 11	19 34 16. 48	+32 20 52. 6	−1 25. 62	− 0 52. 3	t30, 6	9. 584n	0. 314	+1. 82	− 8. 7
June 29	12 40 41	22 10 14. 25	+44 47 0. 1	−2 15. 18	+ 7 27. 9	t30, 6	9. 658n	9. 685	+2. 12	− 3. 8
ZLATINSKY (1914 b)										
1914										
May 21	9 2 40	5 19 22. 95	+46 23 34. 1	−4 8. 20	− 6 52. 8	t25, 5	9. 780	0. 768	+0. 17	+11. 7
23	8 49 3	6 4 21. 65	+42 13 17. 8	−1 4. 18	+ 2 54. 9	t19, 4	9. 781	0. 702	+0. 45	+11. 4
26	8 54 59	6 59 22. 46	+34 3 58. 8	+1 17. 31	+ 2 36. 3	t30, 6	9. 741	0. 675	+0. 75	+ 9. 5
31	8 53 16	7 58 19. 98	+20 16 45. 7	−0 54. 05	− 3 45. 0	t30, 6	9. 684	0. 685	+0. 94	+ 4. 7
June 2	9 6 29	8 13 59. 95	+15 36 1. 0	+1 45. 30	+ 1 0. 3	t25, 5	9. 674	0. 707	+0. 93	+ 3. 0
NEUJMIN (1914 c)										
1914										
July 28	10 31 9	17 38 24. 30	− 6 43 28. 2	−3 21. 59	+4 40. 6	t30, 6	9. 179	0. 794	+3. 38	−6. 2

DELAVAN (1913 f)—Continued

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
2 52 30. 28	+ 7 18 26. 5	AG Leipzig II 1101	4	26	183	Bn.	Barely visible in 2-in. Perhaps trace of tail. Windy.
2 51 37. 55	+ 8 2 13. 0	AG Leipzig II 1092	3	26	183	Bn.	Perhaps barely visible in 2-in. Fairly brt. nucleus.
5 54 59. 24	+37 43 56. 4	AG Lund 3046	4	26	183	Ws.	V. brt. nucleus. Conspicuous tail.
6 55 20. 93	+43 49 25. 5	AG Bonn 5680	4	26	183	Ws.	V. brt. nucleus. Conspicuous tail. Haze.
9 21 5. 67	+50 3 55. 2	AG Harvard 3392	4	12	115	Ws.	V. brt. nucleus. Smooth, well-defined tail.
10 18 34. 99	+49 31 57. 5	AG Bonn 7590	4	12	115	Ws.	Appearance similar to that on Sept. 9. Est. mag. of nucleus 4 to 4½.
11 25 16. 55	+46 43 56. 0	AG Bonn 8069	3	12	115	Bn.	Brt. nucleus.
12 12 25. 93	+43 33 54. 3	AG Bonn 8423	2	12	115	Bn.	Haze.
13 57 26. 50	+28 49 29. 9	AG Cambridge 6690	4	12	115	Bn.	
14 29 15. 93	+23 18 50. 9	AG Berlin B 5098	4	12	115	Bn.	Star v. ft. at last.
14 28 38. 34	+22 38 16. 3	AG Berlin B 5095	3	12	115	Bn.	
17 7 32. 12	−17 30 3. 7	AG Washington 6153	4	26	183	Bn.	Barely visible in 5-in. Fairly brt. nucleus. Ft. tail.

KRITZINGER (1914 a)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
16 14 12. 07	− 8 51 39. 2	AG Wien-Ottakring 5660	--	26	183	Ws.	Ft. nucleus. Apparently short tail preceding. Haze.
16 29 44. 47	− 6 38 59. 5	AG Wien-Ottakring 5733	3	26	---	Ws.	Ft. nucleus.
17 17 9. 94	+ 4 15 33. 9	AG Albany 5744	3	26	183	Ws.	
17 35 47. 60	+ 7 50 51. 6	AG Leipzig II 7972	--	26	183	Ws.	Visible in 5-in. Ft. nucleus and nebulosity. Haze.
19 35 40. 28	+32 21 53. 6	AG Leiden 7531	2	26	183	Ws.	Ft. nucleus and nebulosity.
22 12 27. 31	+44 39 36. 0	AG Bonn 16527	--	26	183	Ws.	Ft. at times. Ft. nucleus.

ZLATINSKY (1914 b)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
5 23 30. 98	+46 30 15. 2	AG Bonn 4473	3	26	183	Bn.	Visible in 2-in. Ft. nucleus. No tail.
6 5 25. 38	+42 10 11. 5	AG Bonn 5062	3	26	183	Bn.	Visible in 2-in. V. ft. at last. Stopped by clds.
6 58 4. 40	+34 1 13. 0	AG Leiden 2944	2	26	183	Bn.	Visible in 2-in. Ft. nucleus and nebulosity.
7 59 13. 09	+20 20 26. 0	AG Berlin B 3240	2	26	183	Bn.	Visible in 5-in. Ft. nucleus and nebulosity. Moonlight.
8 12 13. 72	+15 34 57. 7	AG Berlin A 3264	3	26	183	Bn.	Visible in 5-in. Moonlight. Haze.

NEUJMIN (1914 c)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
17 41 42. 51	− 6 48 2. 6	AG Wien-Ottakring 5991	4	26	183	Ws.	Ft. and diffuse.

CAMPBELL-WESTLAND-LUNT (1914 e)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log *pp* α	Log *pp* δ	Star to App. Place α	Star to App. Place δ
1914	h m s	h m s	° ′ ″	m s	′ ″				s	″
Oct. 1	11 2 18	22 48 43. 61	−26 19 5. 7	+5 26. 02	+2 23. 9	t20, 4	9. 074	0. 897	+4. 44	+17. 3
10	9 27 55	22 5 36. 94	− 9 43 50. 5	+2 1. 21	+3 0. 0	t20, 5	8. 880	0. 817	+3. 84	+17. 0
18	9 24 20	21 51 45. 11	− 2 19 58. 1	+6 16. 42	+2 1. 1	t20, 4	9. 192	0. 760	+3. 51	+17. 3
23	10 4 30	21 47 52. 05	+ 0 38 52. 0	−3 34. 44	−7 7. 1	t20, 4	9. 428	0. 735	+3. 44	+18. 9
Nov. 10	6 27 24	21 47 25. 80	+ 6 51 41. 9	+2 11. 48	−4 34. 4	t5, 1	7. 768*n*	0. 666	+3. 05	+19. 9
10	8 36 55	21 47 27. 44	+ 6 53 2. 3	−3 59. 08	+1 53. 1	t25, 5	9. 384	0. 678	+3. 09	+20. 3
19	9 57 12	21 51 22. 62	+ 8 51 32. 6	−1 19. 48	−2 4. 4	t50, 10	9. 602	0. 690	+2. 93	+20. 8

MELLISH (1915 a)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log *pp* α	Log *pp* δ	Star to App. Place α	Star to App. Place δ
1915										
Feb. 17	16 43 41	17 12 12. 23	+ 2 36 55. 4	−3 9. 18	−1 35. 7	t30, 6	9. 467*n*	0. 720	+0. 54	−16. 9
19	16 18 15	17 14 43. 43	+ 2 27 58. 5	−3 21. 19	+2 54. 4	t30, 6	9. 509*n*	0. 723	+0. 58	−16. 9
26	17 19 55	17 23 37. 58	+ 1 55 15. 0	−3 53. 77	+1 11. 9	t25, 5	9. 282*n*	0. 723	+0. 77	−17. 1
Mar. 9	15 23 30	17 37 22. 20	+ 1 0 30. 7	−1 47. 62	−5 41. 3	t30, 6	9. 521*n*	0. 734	+1. 04	−17. 0
18	15 14 42	17 48 36. 44	+ 0 7 32. 4	−4 7. 80	+3 10. 1	t30, 6	9. 491*n*	0. 739	+1. 23	−16. 5
31	13 21 36	18 4 40. 74	− 1 33 50. 2	+3 13. 47	−5 58. 9	t30, 6	9. 607*n*	0. 747	+1. 58	−15. 5
Apr. 7	13 55 20	18 13 28. 67	− 2 50 6. 9	−3 14. 28	−1 18. 6	t25, 5	9. 539*n*	0. 757	+1. 76	−14. 0
17	12 22 48	18 26 13. 47	− 5 21 26. 3	−2 17. 93	−1 9. 8	t30, 6	9. 621*n*	0. 759	+2. 00	−12. 0
May 8	13 59 37	18 58 12. 68	−16 50 34. 8	−2 3. 47	−0 59. 0	t30, 6	9. 360*n*	0. 846	+2. 68	− 4. 9
10	12 53 15	19 2 4. 57	−18 42 46. 6	−2 9. 40	−5 14. 2	t25, 5	9. 527*n*	0. 831	+2. 74	− 3. 9
17	13 22 57	19 19 7. 31	−27 28 3. 6	+0 53. 29	+3 35. 2	t30, 6	9. 462*n*	0. 875	+3. 12	+ 0. 4
19	13 23 42	19 25 22. 60	−30 40 50. 3	−2 16. 87	+5 7. 9	t30, 6	9. 468*n*	0. 883	+3. 24	+ 2. 1
Nov. 9	12 22 29	4 59 39. 57	− 6 59 48. 1	−2 3. 53	−5 3. 4	t25, 5	9. 218*n*	0. 795	+4. 34	+17. 9
10	10 56 4	4 57 19. 97	− 6 40 0. 6	−1 47. 04	+4 29. 5	t30, 6	9. 481*n*	0. 782	+4. 38	+18. 0
16	10 2 51	4 42 38. 41	− 4 31 28. 2	+2 56. 71	−4 17. 8	t25, 5	9. 510*n*	0. 768	+4. 58	+18. 5
Dec. 14	10 41 38	3 46 23. 32	+ 5 17 37. 6	−1 51. 06	+3 28. 3	t25, 5	8. 718	0. 685	+5. 02	+19. 7
22	9 9 48	3 36 30. 96	+ 7 38 24. 1	−1 45. 86	+0 5. 7	t25, 5	8. 692*n*	0. 657	+5. 06	+20. 2
1916										
Jan. 8	8 25 51	3 24 16. 75	+11 53 11. 3	−1 11. 15	−6 49. 9	t24, 5	8. 336	0. 599	+1. 74	+ 9. 1

NOTES.—May 8. Seems to be double, having a faint component preceding a trifle north. This component and a fainter one, intermediate, were found at Yerkes on May 12 (A. J. XXIX, 40). Tail noticeable in 5-in. May 10. Component seen. May 17. Coordinates of component measured. May 19. Coordinates of component measured. Clouds interfered second half of *s* causing delay of about 15 minutes.

TAYLOR (1915 e)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log *pp* α	Log *pp* δ	Star to App. Place α	Star to App. Place δ
1915										
Dec. 6	11 33 31	5 22 42. 88	+ 0 1 35. 7	−1 26. 58	+4 19. 7	t25, 5	8. 993*n*	0. 740	+4. 94	+11. 3
8	11 40 19	5 21 36. 78	+ 0 24 4. 8	−4 41. 00	+5 52. 2	t25, 5	8. 828*n*	0. 736	+4. 99	+10. 8
14	12 51 55	5 18 0. 49	+ 1 46 33. 6	+0 47. 43	−0 28. 1	t25, 5	9. 108	0. 724	+5. 10	+11. 1
18	10 24 31	5 15 37. 15	+ 2 51 5. 5	−0 53. 38	+0 20. 9	t25, 5	9. 104*n*	0. 713	+5. 16	+10. 5
22	10 46 53	5 13 13. 34	+ 4 6 23. 2	−0 54. 58	+1 1. 1	t25, 5	8. 678*n*	0. 699	+5. 24	+10. 4

CAMPBELL-WESTLAND-LUNT (1914 e)

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
22 43 13. 14	−26 21 46. 8	1st Gr. Cat. of Stars for 1925.0, 2510	3	26	183	Bn.	Visible in 5-in. Fairly brt. nucleus. Moonlight.
22 3 31. 89	− 9 47 7. 5	AG Harvard 7820; AG Wien-Ottakring 7931.	4	26	178	Bn.	Barely visible in 2-in. Ft. nucleus. Thin clds.
21 45 25. 18	− 2 22 16. 5	AG Straszburg 7628	3	26	178	Bn.	Visible in 2-in. Ft. nucleus. Seems to be ft. tail following.
21 51 23. 05	+ 0 45 40. 2	AG Nicolajew 5530	3	26	178	Bn.	Visible in 5-in.
21 45 11. 27	+ 6 55 56. 4	AG Leipzig II 10963	--	26	183	Bn.	Clds.
21 51 23. 43	+ 6 50 48. 9	AG Leipzig II 11013	2	26	183	Bn.	Visible in 5-in.
21 52 39. 17	+ 8 53 16. 2	AG Leipzig II 11033	--	26	183	Bn.	V. ft.

MELLISH (1915 a)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
17 15 20. 87	+ 2 38 48. 0	AG Albany 5730	3	26	183	Bn.	Barely visible in 5-in. Small, ft. nucleus.
17 18 4. 04	+ 2 25 21. 0	AG Albany 5752	3	26	183	Bn.	Visible in 5-in. Ft. nucleus.
17 27 30. 58	+ 1 54 20. 2	AG Albany 5811	4	26	183	Bn.	Visible in 5-in.
17 39 8. 78	+ 1 6 29. 0	AG Nicolajew 4391	2	26	183	Bn.	Visible in 5-in. Fairly brt. nucleus.
17 52 43. 01	+ 0 4 38. 8	AG Nicolajew 4455	4	26	183	Bn.	Barely visible in 2-in.
18 1 25. 69	− 1 27 35. 8	AG Nicolajew 4487	4	26	183	Bn.	Not visible in 5-in. Moonlight.
18 16 41. 19	− 2 48 34. 3	AG Straszburg 6136	3	26	183	Bn.	Visible in 2-in. Brt. nucleus.
18 28 29. 40	− 5 20 4. 5	AG Straszburg 6202	4	26	183	Bn.	Barely visible in 2-in. Fairly brt. nucleus. Perhaps haze.
19 0 13. 47	−16 49 30. 9	AG Washington 7066	4	26	183	Bn.	Visible in 2-in. Brt. nucleus. Clds. Haze.
19 4 11. 23	−18 37 28. 5	AG Algiers 8112	3	26	183	Bn.	Fainter than on May 8. Perhaps haze.
19 18 10. 90	−27 31 39. 2	Cordoba B 12679	4	26	183	Bn.	Visible to naked eye. 5^m. Brt. nucleus.
19 27 36. 23	−30 46 0. 3	Cordoba B 12797	3	26	183	Bn.	Visible to naked eye. 5^m.
5 1 38. 76	− 6 55 2. 6	AG Wien-Ottakring 1334	3	26	183	Bn.	Visible in 5-in.
4 59 2. 63	− 6 44 48. 1	AG Wien-Ottakring 1321	3	26	183	Bn.	Visible in 5-in.
4 39 37. 12	− 4 27 28. 9	AG Straszburg 1250	2	26	183	Bn.	Visible in 5-in. Moonlight.
3 48 9. 36	+ 5 13 49. 6	AG Leipzig II 1429; AG Albany 1129	3	26	183	Bn.	Moonlight. Not visible in 5-in.
3 38 11. 76	+ 7 37 58. 2	AG Leipzig II 1364	3	26	183	Bn.	Moonlight. Not visible in 5-in.
3 25 26. 16	+11 59 52. 1	AG Leipzig I 1022	4	26	---	Bn.	

Measures of coordinates of component with respect to main comet:

Date	W. M. T.	p	W. M. T.	s	Comp.	Seeing	Power	Illumination
1915	h m s	°	h m s	″				
May 17	14 29 6	288. 12	14 29 8	39. 34	4, 4	Poor	388	Red wires.
19	14 23 34	291. 03	14 23 24	42. 28	4, 4	Fair	388–183	Red wires.

TAYLOR (1915 e)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
5 24 4. 52	− 0 2 55. 3	AG Nicolajew 1332	3	26	183	Bn.	Barely visible in 5-in. Ft. nucleus. Seems to be ft. tail preceding north.
5 26 12. 79	+ 0 18 1. 8	AG Nicolajew 1353	4	26	183	Bn.	Barely visible in 5-in.
5 17 7. 96	+ 1 46 50. 6	AG Albany 1671	3	26	183	Bn.	Not visible in 5-in.
5 16 25. 37	+ 2 50 34. 1	AG Albany 1664	4	26	183	Bn.	Moonlight. Windy.
5 14 2. 68	+ 4 5 11. 7	AG Albany 1649	3	26	183	Bn.	Moonlight. Not visible in 5-in.

TAYLOR (1915 e)—Continued

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1916	h m s	h m s	° ′ ″	m s	′ ″				s	″
Jan. 3	9 58 41	5 7 43. 87	+ 8 34 18. 7	+1 17. 78	− 2 14. 2	t25, 5	8. 592n	0. 645	+2. 14	+ 6. 0
7	8 45 7	5 6 50. 70	+10 12 55. 9	−1 7. 92	− 5 38. 5	t30, 6	9. 182n	0. 630	+2. 19	+ 6. 1
25	11 23 12	5 11 35. 12	+17 58 31. 5	−2 5. 46	+ 4 12. 6	t20, 4	9. 462	0. 549	+2. 21	+ 6. 8
Feb. 29	8 11 29	6 3 58. 06	+29 23 54. 9	−0 48. 23	+ 2 3. 7	t27, 9	8. 976	0. 170	+2. 31	+ 7. 6
Mar. 31	11 12 23	7 22 7. 89	+33 2 11. 8	+1 35. 75	+ 0 26. 5	t35, 6	9. 700	0. 496	+2. 32	+ 5. 4

NEUJMIN (1916 a)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1916										
Mar. 4	9 12 12	8 59 44. 87	+11 29 8. 7	+1 27. 91	+ 3 21. 0	t25, 5	9. 064n	0. 609	+2. 70	− 8. 1
31	9 9 32	9 26 44. 22	− 1 4 7. 9	−3 44. 02	− 2 24. 1	t29, 6	8. 584	0. 750	+2. 40	−12. 9
Apr. 6	9 47 25	9 36 47. 24	− 3 17 5. 5	+0 59. 36	+ 3 42. 7	t30, 6	9. 144	0. 768	+2. 32	−13. 9
May 5	10 35 1	10 36 31. 30	−11 21 42. 0	+3 26. 96	− 2 42. 2	t25, 5	9. 505	0. 804	+2. 21	−18. 6

WOLF (1916 b)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1916										
May 6	11 17 30	12 36 9. 49	+ 3 7 53. 2	−2 15. 20	+ 5 51. 1	t25, 5	9. 287	0. 712	+2. 90	−17. 8
June 3	10 9 58	12 28 53. 37	+ 4 32 7. 5	−5 2. 91	− 6 33. 9	t25, 5	9. 446	0. 703	+2. 72	−15. 4
26	9 40 46	12 30 26. 27	+ 4 43 47. 3	−3 11. 51	− 1 5. 0	t20, 4	9. 561	0. 710	+2. 50	−13. 6
July 6	10 34 38	12 33 18. 39	+ 4 33 48. 1	−0 37. 57	− 4 55. 6	t20, 4	9. 647	0. 728	+2. 40	−13. 1
1917										
Jan. 25	17 33 27	16 52 32. 69	− 5 28 3. 1	+2 14. 78	+ 6 40. 0	t25, 5	9. 509n	0. 774	+0. 50	− 8. 6
Feb. 24	17 5 3	17 57 3. 47	− 2 32 47. 0	+1 40. 17	+ 3 27. 9	t30, 6	9. 453n	0. 758	+1. 03	−10. 1
Mar. 6	17 26 56	18 19 51. 14	− 0 57 20. 7	−1 36. 59	− 5 29. 0	t10, 2	9. 341n	0. 748	+1. 18	−10. 0
Apr. 3	15 3 43	19 25 56. 10	+ 5 4 7. 0	+3 38. 49	+ 2 21. 9	t30, 6	9. 567n	0. 709	+1. 59	− 8. 4
9	15 29 33	19 40 33. 02	+ 6 37 30. 5	−3 33. 78	− 5 31. 0	t30, 6	9. 510n	0. 690	+1. 60	− 7. 3
May 1	14 8 0	20 34 14. 31	+12 41 22. 0	−3 45. 87	+ 0 17. 1	t25, 5	9. 594n	0. 657	+1. 90	− 4. 0
9	14 1 35	20 53 42. 10	+14 54 11. 1	−1 7. 84	+ 5 33. 0	t25, 5	9. 591n	0. 635	+2. 03	− 2. 5
19	14 21 14	21 17 45. 38	+17 32 44. 2	+2 24. 21	+ 4 20. 2	t25, 5	9. 543n	0. 583	+2. 19	− 0. 8
24	14 47 22	21 29 35. 64	+18 46 43. 4	−2 16. 52	+ 0 57. 5	t27, 6	9. 475n	0. 540	+2. 27	+ 0. 6
June 15	15 0 12	22 18 31. 68	+23 3 27. 6	+3 19. 66	− 2 16. 3	t27, 6	9. 331n	0. 421	+2. 71	+ 5. 3
16	14 48 1	22 20 34. 64	+23 11 47. 6	−3 44. 87	+ 5 6. 6	t25, 5	9. 370n	0. 427	+2. 71	+ 5. 7
20	12 17 2	22 28 27. 78	+23 41 2. 3	−4 7. 01	+ 0 6. 0	t25, 5	9. 652n	0. 583	+2. 81	+ 6. 8
21	14 25 30	22 30 36. 63	+23 48 16. 0	−3 23. 87	+ 4 26. 0	t29, 10	9. 415n	0. 426	+2. 84	+ 7. 0
29	12 31 34	22 45 31. 57	+24 27 15. 4	+4 4. 91	− 5 46. 0	t25, 5	9. 618n	0. 532	+3. 02	+ 8. 6
29	14 16 15	22 45 39. 07	+24 27 31. 0	+0 5. 03	− 5 23. 3	d12, 14	9. 394n	0. 404	+3. 01	+ 8. 7
July 23	12 11 23	23 20 50. 69	+23 39 19. 8	+2 24. 02	+ 0 20. 0	t25, 5	9. 555n	0. 495	+3. 59	+15. 3
30	11 51 4	23 27 47. 88	+22 32 0. 7	−3 45. 63	− 0 26. 3	t30, 6	9. 551n	0. 512	+3. 74	+17. 4
Aug. 11	12 53 47	23 36 1. 83	+19 36 5. 8	+1 28. 94	+ 2 22. 9	t25, 5	9. 229n	0. 481	+4. 00	+21. 0
20	12 38 54	23 39 14. 93	+16 38 7. 5	−2 29. 27	− 3 49. 0	t25, 5	9. 122n	0. 529	+4. 15	+23. 5
22	12 12 12	23 39 39. 59	+15 54 12. 9	+1 4. 51	+ 1 19. 5	t30, 6	9. 230n	0. 548	+4. 18	+24. 0
25	11 12 29	23 40 6. 99	+14 46 4. 2	−0 56. 66	+10 40. 7	t25, 5	9. 411n	0. 586	+4. 22	+24 8
Sept. 12	12 35 58	23 39 47. 43	+ 7 11 32. 1	+0 21. 32	+ 5 28. 3	d10, 10	8. 660	0. 663	+4. 45	+28. 5
13	11 30 19	23 39 41. 87	+ 6 47 9. 5	+1 54. 41	− 0 47. 8	t25, 5	8. 892n	0. 668	+4. 46	+28. 6
18	11 55 18	23 39 9. 72	+ 4 41 14. 1	+2 35. 51	− 3 6. 3	t30, 6	8. 098	0. 692	+4. 47	+28. 9
22	11 55 14	23 38 47. 01	+ 3 4 46. 0	+2 5. 94	− 5 44. 2	t30, 6	8. 649	0. 710	+4. 50	+29. 2
Oct. 3	9 17 28	23 38 22. 51	− 0 50 56. 3	−0 49. 81	− 9 53. 8	t25, 5	9. 252n	0. 748	+4. 53	+29. 4
6	9 19 50	23 38 29. 85	− 1 47 37. 3	+2 10. 26	+ 1 11. 2	t25, 5	9. 184n	0. 756	+4. 55	+29. 4
20	10 14 3	23 40 47. 05	− 5 20 19. 0	−2 51. 29	+ 2 41. 4	t25, 5	8. 767	0. 786	+4. 53	+28. 5
22	11 31 19	23 41 22. 70	− 5 44 11. 7	−1 44. 59	+ 3 56. 2	t45, 9	9. 341	0. 783	+4. 53	+28. 4
Nov. 5	10 57 39	23 47 12. 46	− 7 42 32. 9	−5 38. 10	+ 5 55. 4	t23, 5	9. 393	0. 794	+4. 49	+27. 2
8	10 31 41	23 48 49. 71	− 7 58 47. 9	+4 12. 09	− 6 47. 8	t25, 5	9. 342	0. 798	+4. 42	+26. 8
16	10 19 13	23 53 46. 25	− 8 28 56. 6	−6 43. 02	+ 9 25. 4	t30, 6	9. 389	0. 799	+4. 40	+26. 1
17	8 47 46	23 54 24. 62	− 8 31 20. 8	−6 4. 65	+ 7 1. 3	t25, 5	8. 899	0. 809	+4. 40	+26. 0
19	8 36 54	23 55 47. 74	− 8 35 35. 2	−4 41. 52	+ 2 47. 0	t25, 5	8. 849	0. 810	+4. 39	+25. 9
Dec. 1	8 43 14	0 5 4. 81	− 8 42 9. 1	+0 13. 35	− 2 6. 8	d5, 4	9. 196	0. 807	+4. 30	+24. 9
10	7 30 58	0 12 54. 21	− 8 29 14. 4	−1 34. 91	+ 0 57. 0	t25, 5	8. 844	0. 809	+4. 22	+24. 0

TAYLOR (1915 e)—Continued

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
5 6 23.95	+ 8 36 26.9	AG Leipzig II 2042	4	26	388	Bn.	Visible in 5-in.
5 7 56.43	+10 18 28.3	AG Leipzig I 1553	4	26	388	Bn.	Visible in 5-in.
5 13 38.37	+17 54 12.1	AG Berlin A 1459	3–4	26	388	Bn.	Clds. Poor obsn.
6 4 43.98	+29 21 43.6	AG Cambridge 3003	2	26	388	Bn.	Barely visible in 5-in.
7 20 29.82	+33 1 39.9	AG Leiden 3125	--	26	388	Bn.	V. ft. Poor obsn. Perhaps haze.
NEUJMIN (1916 a)							
8 58 14.26	+11 25 55.8	AG Leipzig I 3627	3	26	388	Bn.	Barely visible in 5-in. Ft. nucleus.
9 30 25.84	− 1 1 30.9	AG Nicolajew 2893	3	26	388	Bn.	Ft. Not visible in 5-in.
9 35 45.56	− 3 20 34.3	AG Straszburg 3763	4	26	183	Bn.	Ft. Windy.
10 33 2.13	−11 18 41.2	AG Harvard 4026	3	26	183	Bn.	Ft.
WOLF (1916 b)							
12 38 21.79	+ 3 2 19.9	AG Albany 4546	3	26	388	Bn.	V. ft. Probably haze.
12 33 53.56	+ 4 38 56.8	AG Albany 4527	4	26	388	Bn.	Ft. Poor obsn.
12 33 35.28	+ 4 45 5.9	AG Albany 4524; AG Leipzig II 6182	3	26	388	Bn.	Ft.
12 33 53.56	+ 4 38 56.8	AG Albany 4527	3	26	183	Bn.	V. ft. Moonlight. Poor obsn.
16 50 17.41	− 5 34 34.5	AG Straszburg 5782	4	26	183	Bn.	V. ft. nucleus.
17 55 22.27	− 2 36 4.8	AG Straszburg 6029	3	26	183	Bn.	Ft. Haze.
18 21 26.55	− 0 51 41.7	AG Nicolajew 4577	3	26	---	Bn.	Ft. Clds. Stopped by dawn.
19 22 16.02	+ 5 1 53.5	AG Albany 6684	3	26	183	Bn.	Ft. Not visible in 5-in.
19 44 5.20	+ 6 43 8.8	AG Leipzig II 9560	3	26	183	Bn.	Ft. Moonlight.
20 37 58.28	+12 41 8.9	AG Leipzig I 8088	4	26	183	Bn.	
20 54 47.91	+14 48 40.6	AG Leipzig I 8261	4	26	183	Bn.	Ft. Moonlight. Poor obsn.
21 15 18.98	+17 28 24.8	AG Berlin A 8688	3	26	388	Bn.	Barely visible in 5-in.
21 31 49.89	+18 45 45.3	AG Berlin A 8808	3	26	388	Bn.	Haze. Clds.
22 15 9.31	+23 5 38.6	AG Berlin B 8599	3	26	183	B.	Visible in 5-in. Poor obsn.
22 24 16.80	+23 6 35.3	AG Berlin B 8644	3	26	388	Bn.	Visible in 2-in.
22 32 31.98	+23 40 49.5	AG Berlin B 8685	3	26	388	Bn.	
22 33 57.66	+23 43 43.0	AG Berlin B 8695	3	26	183	B.	Easily visible in 5-in. Poor obsn.
22 41 23.64	+24 32 52.8	AG Berlin B 8734	4	26	388	Bn.	Poor obsn.
22 45 31.03	+24 32 45.6	AG Berlin B 8761	3	26	183	B.	Easily visible in 5-in. Head about 3″.5 in diameter.
23 18 23.08	+23 38 44.5	AG Berlin B 8946	2	26	388	Bn.	
23 31 29.77	+22 32 9.6	AG Berlin B 9034	3	26	388	Bn.	Ft. Moonlight.
23 34 28.89	+19 33 21.9	AG Berlin A 9645	4	26	183	Bn.	
23 41 40.05	+16 41 33.0	AG Berlin A 9683	2	26	388	Bn.	Ft. at times. Haze.
23 38 30.90	+15 52 29.4	PGC Boss 6088	3	26	183	B.	Easily visible in 5-in.
23 40 59.43	+14 34 58.7	AG Leipzig I 9424	4	26	183	Bn.	
23 39 21.66	+ 7 5 35.3	AG Leipzig II 11746	4	26	183	B.	Easily visible in 5-in.
23 37 43.00	+ 6 47 28.7	AG Leipzig II 11738	2	26	388	Bn.	
23 36 29.74	+ 4 43 51.5	Ast Tou +5°.2332, 83	3	26	183	B.	Easily vis. in 5-in. Diffuse, about 4″ in diameter.
23 36 36.57	+ 3 10 1.0	AG Albany 8136	3	26	183	B.	Easily visible in 5-in. Diffuse. Haze. Poor obsn.
23 39 7.79	− 0 41 31.9	AG Nicolajew 5882	4	26	183	Bn.	Ft. Moonlight.
23 36 15.04	− 1 49 17.9	AG Straszburg 8116	4	26	183	Bn.	Barely visible in 5-in.
23 43 33.81	− 5 23 28.9	AG Straszburg 8141	4	26	183	Bn.	Barely visible in 5-in.
23 43 2.76	− 5 48 36.3	Ast Fer −5°.2340, 127; −6°2344, 63	3	26	183	B.	Barely visible in 5-in. Poor obsn.
23 52 46.07	− 7 48 55.5	AG Wien-Ottakring 8433	3	26	183	Bn.	Barely visible in 5-in.
23 44 33.20	− 7 52 26.9	AG Wien-Ottakring 8409	4	26	183	Bn.	Barely visible in 5-in.
0 0 24.87	− 8 38 48.1	AG Wien-Ottakring 8467	3	26	183	B.	Poor obsn.
0 0 24.87	− 8 38 48.1	AG Wien-Ottakring 8467	4	26	183	Bn.	
0 0 24.87	− 8 38 48.1	AG Wien-Ottakring 8467	3	26	183	Bn.	
0 4 47.16	− 8 40 27.2	AG Wien-Ottakring 16	5	26	183	Bn.	V. ft. Obsn. unsatisfactory
0 14 24.90	− 8 30 35.4	AG Wien-Ottakring 49	3	26	183	Bn.	V. ft. Poor obsn.

1757—29——14

MELLISH (1917 a)

Date	W. M. T.	Apparent Place of Comet		Comet—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
1917	h m s	h m s	° ′ ″	m s	′ ″				s	″
Mar. 22	8 29 52	2 8 42. 25	+15 6 34. 1	+0 10. 46	+12 59. 4	t3, 1	9. 674	0. 738	+0. 63	+ 5. 6
24	7 40 30	2 7 23. 35	+15 48 2. 0	−3 39. 58	− 0 37. 0	t25, 5	9. 675	0. 710	+0. 62	+ 5. 6
30	7 31 47	1 59 11. 46	+17 45 54. 6	−4 1. 38	+ 7 45. 7	t20, 4	9. 681	0. 722	+0. 58	+ 5. 7

SCHAUMASSE (1917 b)

Date	W. M. T.	App. α	App. δ	C−S α	C−S δ	Comp.	Log $p\rho$ α	Log $p\rho$ δ	Star to App. α	Star to App. δ
1917 May 1	15 53 37	23 11 58. 54	+14 13 14. 8	−1 13. 13	− 1 16. 0	t25, 5	9. 646*n*	0. 677	+1. 13	+ 2. 2
9	15 53 59	23 30 58. 50	+23 11 41. 7	+3 12. 96	+ 0 44. 2	t14, 3	9. 660*n*	0. 600	+1. 20	+ 1. 2
18	15 29 57	1 4 51. 20	+47 15 7. 6	+5 43. 96	+ 3 19. 1	t20, 4	9. 828*n*	0. 543	+0. 84	+ 0. 4
June 4	9 51 49	8 56 29. 00	+29 47 10. 1	−1 15. 61	+ 5 3. 4	t13, 3	9. 721	0. 665	+1. 93	− 2. 6
13	9 5 55	9 22 34. 61	+19 44 28. 3	−2 47. 86	− 5 0. 1	t25, 5	9. 676	0. 670	+1. 88	− 6. 3
16	9 18 49	9 26 56. 35	+17 44 17. 0	−6 34. 37	+ 0 32. 9	t10, 2	9. 678	0. 697	+1. 87	− 7. 2

WOLF (1918 b)

Date	W. M. T.	App. α	App. δ	C−S α	C−S δ	Comp.	Log $p\rho$ α	Log $p\rho$ δ	Star to App. α	Star to App. δ
1918 July 15	12 13 21	20 31 59. 51	+25 32 51. 9	+1 48. 95	−0 40. 4	t40, 8	9. 001*n*	0. 314	+3. 75	+12. 6
Aug. 2	13 40 18	20 19 5. 25	+26 48 1. 8	−2 15. 73	−3 15. 5	t30, 6	9. 426	0. 356	+3. 91	+17. 5
5	10 37 11	20 16 48. 41	+26 45 16. 6	+1 20. 01	+0 54. 5	t30, 6	8. 991*n*	0. 274	+3. 91	+18. 1
13	11 44 4	20 10 37. 35	+26 13 51. 7	+1 59. 14	−0 27. 7	t25, 5	9. 125	0. 303	+3. 87	+19. 7
16	12 29 29	20 8 29. 41	+25 52 59. 6	+0 36. 22	−1 7. 3	t30, 10	9. 405	0. 372	+3. 86	+20. 4
Sept. 25	8 59 26	20 7 3. 98	+15 16 20. 1	+5 20. 20	+0 1. 2	t15, 3	9. 146	0. 554	+3. 56	+24. 4
27	8 58 19	20 8 41. 84	+14 34 9. 6	+2 42. 13	+3 59. 6	t25, 5	9. 174	0. 566	+3. 58	+24. 6
28	8 32 5	20 9 33. 77	+14 13 18. 7	−1 12. 96	−1 30. 4	t30, 6	9. 014	0. 567	+3. 60	+24. 9
Oct. 1	10 19 37	20 12 32. 32	+13 8 0. 4	−5 5. 94	−2 2. 6	t10, 2	9. 495	0. 623	+3. 61	+25. 1
2	9 39 34	20 13 33. 62	+12 47 17. 2	+1 7. 74	+2 47. 2	t25, 5	9. 401	0. 611	+3. 56	+24. 7
9	9 27 29	20 22 5. 85	+10 19 45. 1	−6 37. 02	−8 39. 1	t25, 5	9. 417	0. 643	+3. 58	+25. 5
23	8 13 40	20 44 44. 82	+ 5 42 49. 4	+0 56. 67	+0 1. 5	t30, 6	9. 269	0. 685	+3. 54	+25. 2
31	7 54 59	21 0 39. 37	+ 3 22 2. 3	+2 41. 00	−5 0. 7	t29, 6	9. 254	0. 709	+3. 53	+25. 0
Nov. 4	9 31 46	21 9 28. 08	+ 2 16 44. 0	+0 47. 86	−2 0. 9	t24, 5	9. 539	0. 726	+3. 54	+25. 2
6	8 0 23	21 13 49. 17	+ 1 47 18. 3	−1 14. 50	+2 24. 2	t50, 10	9. 318	0. 725	+3. 57	+25. 4
Nov. 22	8 16 59	21 52 54. 94	− 1 31 20. 4	+4 3. 78	+0 52. 8	t30, 6	9. 442	0. 751	+3. 61	+25. 4
23	8 16 50	21 55 30. 34	− 1 41 1. 5	+0 18. 08	+4 56. 6	d8, 8	9. 445	0. 752	+3. 64	+25. 5
26	8 16 47	22 3 22. 53	− 2 8 9. 7	+1 40. 35	−7 13. 4	t30, 6	9. 454	0. 756	+3. 62	+25. 4
29	7 30 45	22 11 16. 25	− 2 32 7. 9	+0 23. 45	−4 32. 2	d8, 8	9. 331	0. 760	+3. 63	+25. 4
Dec. 5	8 44 10	22 27 40. 65	− 3 12 13. 5	+5 36. 72	−0 24. 9	t25, 5	9. 533	0. 759	+3. 64	+25. 2
18	6 51 34	23 3 36. 10	− 4 0 39. 8	−3 2. 53	−3 31. 4	t25, 5	9. 267	0. 772	+3. 75	+25. 1
26	6 46 48	23 26 6. 94	− 4 7 38. 3	+0 54. 27	−5 11. 7	t25, 5	9. 284	0. 773	+3. 74	+24. 5
1919 Feb. 19	7 42 55	1 57 0. 10	− 0 0 57. 6	−2 24. 14	+2 51. 2	t25, 5	9. 575	0. 740	+0. 86	− 0. 2
Mar. 1	8 4 48	2 22 59. 14	+ 1 6 13. 0	−1 14. 40	−1 5. 5	t25, 5	9. 615	0. 736	+0. 88	− 0. 8
3	7 40 36	2 28 4. 54	+ 1 19 18. 8	−0 44. 80	+0 52. 4	t25, 5	9. 593	0. 734	+0. 87	− 1. 0

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
MELLISH (1917 a)							
h m s	° ′ ″			in.			
2 8 31.16	+14 53 29.1	AG Leipzig I 654	4	12	115	Bn.	Too near horizon to finish.
2 11 2.31	+15 48 33.4	AG Berlin A 630	3	26	183	Bn.	Visible in 2-in. Brt. nucleus. Tail 5′ or more long at $p=70°$.
2 3 12.26	+17 38 3.2	AG Berlin A 602	4	26	183	Bn.	
SCHAUMASSE (1917 b)							
23 13 10.54	+14 14 28.6	AG Leipzig I 9268	4	26	183	Bn.	Visible in 5-in. Not well-defined nucleus.
23 27 44.34	+23 10 56.3	AG Berlin B 9010	4	26	183	Bn.	Ft. Dawn.
0 59 6.40	+47 11 48.1	AG Bonn 866	4	26	183	Bn.	
8 57 42.68	+29 42 9.3	AG Cambridge 4795	4	26	183	Bn.	Barely visible in 5-in. Moonlight. Poor obsn.
9 25 20.59	+19 49 34.7	AG Berlin B 3770; AG. Berlin A 3832	3	26	183	Bn.	Ft.
9 33 28.85	+17 43 51.3	AG Berlin A 3879	3	26	183	Bn.	Ft. Unsatisfactory obsn.
WOLF (1918 b)							
20 30 6.81	+25 33 19.7	AG Cambridge 11471	2	26	183	Bn.	15^m. Nebulous.
20 21 17.07	+26 50 59.8	AG Cambridge 11261	3	26	183	Bn.	V. ft. Nebulous. Objective fogged.
20 15 24.49	+26 44 4.0	AG Cambridge 11122	2	26	183	Bn.	Ft.
20 8 34.34	+26 13 59.7	AG Cambridge 10981	3	26	183	Bn.	
20 7 49.33	+25 53 46.4	AG Cambridge 10962	3	26	367	Bn.	
20 1 40.22	+15 15 54.5	AG Leipzig I 7690; AG Berlin A 7915	3	26	183	Bn.	Stopped by thin clds.
20 5 56.13	+14 29 45.4	AG Leipzig I 7747	3	26	183	Bn.	
20 10 43.13	+14 14 24.2	AG Leipzig I 7803	3	26	183	Bn.	Haze at times.
20 17 34.65	+13 9 37.9	AG Leipzig I 7870	3	26	183	Bn.	Stopped by clds.
20 12 22.32	+12 44 5.3	AG Leipzig I 7819	3	26	183	Bn.	
20 28 39.29	+10 27 58.7	AG Leipzig I 7983	3	26	183	Bn.	Barely visible in 5-in.
20 43 44.61	+ 5 42 22.7	AG Leipzig II 10357	3	26	183	Bn.	Visible in 5-in. Seems to be ft. tail at $p=70°$.
20 57 54.84	+ 3 26 38.0	AG Albany 7369	4	26	183	Bn.	Visible in 5-in. Haze.
21 8 36.68	+ 2 18 19.7	AG Albany 7429	4	26	183	Bn.	Barely visible in 5-in.
21 15 0.10	+ 1 44 28.7	AG Albany 7468	3	26	183	Bn.	Barely visible in 5-in.
21 48 47.55	− 1 32 38.6	AG Nicolajew 5526	4	26	183	Bn.	Barely visible in 5-in.
21 55 8.62	− 1 46 23.6	⅓ [2 AG Straszburg 7678; +AG Nicolajew 5543.]	4	26	183	Bn.	Visible in 5-in.
22 1 38.56	− 2 1 21.7	AG Straszburg 7706	4	26	183	Bn.	
22 10 49.17	− 2 28 1.1	AG Straszburg 7749	4	26	183	Bn.	Visible in 5-in.
22 22 0.29	− 3 12 13.8	AG Straszburg 7801	4	26	183	Bn.	Visible in 5-in.
23 6 34.88	− 3 57 33.5	AG Straszburg 7989	3	26	183	Bn.	Visible in 5-in. Moonlight.
23 25 8.93	− 4 2 51.1	AG Straszburg 8066	4	26	183	Bn.	Visible in 5-in.
1 59 23.38	− 0 3 48.6	AG Nicolajew 414	4	26	388	Bn.	Not visible in 5-in.
2 24 12.66	+ 1 7 19.3	AG Nicolajew 496	3	26	---	Bn.	Ft. Haze. Poor obsn.
2 28 48.47	+ 1 18 27.4	AG Albany 712; AG Nicolajew 519	3	26	183	Bn.	Ft. Poor obsn.

BORRELLY (1918 c)=(1925 f)

Date	W. M. T.	Apparent Place of Comet		Comet—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
1918	h m s	h m s	° ′ ″	m s	′ ″				s	″
Oct. 23	13 14 42	6 18 35. 97	− 2 39 24. 3	+0 9. 40	+0 37. 6	d8, 8	9. 503*n*	0. 758	+3. 97	+ 4. 0
Nov. 1	13 38 27	6 32 28. 38	+ 1 54 16. 7	+1 35. 27	+1 21. 5	t30, 6	9. 394*n*	0. 725	+4. 27	+ 0. 6
8	12 53 19	6 41 52. 30	+ 6 26 17. 2	+1 22. 99	−0 7. 6	t20, 4	9. 467*n*	0. 688	+4. 56	− 2. 6
25	12 30 46	6 58 20. 80	+21 46 51. 1	+4 17. 45	+3 15. 6	t25, 5	9. 423*n*	0. 472	+5. 47	− 9. 6
25	16 5 22	6 58 25. 56	+21 56 23. 0	+0 4. 68	+0 53. 5	d12, 10	9. 251	0. 433	+5. 46	−10. 2
Dec. 17	9 54 41	6 59 33. 64	+46 5 18. 7	−0 7. 73	−2 19. 8	d12, 12	9. 705*n*	9. 819	+7. 48	−14. 2
18	10 17 17	6 58 57. 85	+47 5 41. 9	+0 23. 71	+3 19. 5	d12, 10	9. 665*n*	9. 002	+7. 61	−14. 0
26	11 23 47	6 52 19. 23	+54 8 28. 6	−0 26. 77	−4 16. 1	d12, 10	9. 365*n*	0. 319n	+8. 65	−12. 2
1919										
Jan. 6	10 11 48	6 40 6. 72	+60 50 0. 4	−3 40. 18	−7 56. 3	t30, 6	9. 535*n*	0. 461n	+4. 66	− 4. 5
9	10 15 38	6 36 48. 99	+62 6 42. 5	−1 39. 91	+1 47. 5	t50, 10	9. 448*n*	0. 509n	+4. 81	− 3. 3
11	9 5 58	6 34 50. 43	+62 49 38. 9	−1 23. 08	−2 38. 5	d12, 10	9. 721*n*	0. 428n	+4. 94	− 2. 6
18	8 52 8	6 29 15. 57	+64 44 36. 2	−1 12. 82	−3 33. 5	d12, 13	9. 685*n*	0. 503n	+5. 29	− 0. 2
20	9 2 4	6 28 12. 89	+65 7 41. 0	+0 1. 99	+2 50. 2	d12, 10	9. 612*n*	0. 538n	+5. 30	+ 0. 6
Feb. 6	7 55 52	6 32 2. 49	+66 14 25. 6	+0 40. 71	+0 27. 4	d12, 10	9. 646*n*	0. 552n	+5. 25	+ 4. 1
24	8 9 57	6 57 55. 77	+64 46 53. 5	−1 45. 13	+2 59. 0	t50, 10	9. 181*n*	0. 579n	+4. 73	+ 4. 4
26	7 48 20	7 1 40. 99	+64 30 50. 5	+0 37. 71	+1 2. 7	t13, 10	9. 362*n*	0. 565n	+4. 66	+ 4. 5
Mar. 21	8 54 11	7 50 58. 27	+60 21 40. 2	+0 18. 74	−0 12. 9	d12, 10	9. 360	0. 485n	+3. 76	+ 2. 9
Apr. 21	10 9 51	8 58 29. 09	+52 52 59. 7	+0 12. 30	−3 1. 5	d12, 10	9. 743	9. 615n	+2. 80	− 0. 1
1925										
Nov. 17	15 17 33	9 56 50. 58	+30 38 12. 1	+1 54. 04	+1 31. 7	t25, 5	9. 559*n*	0. 337	+1. 72	−18. 0
20	14 37 20	10 5 41. 27	+31 44 17. 8	+1 1. 58	+1 43. 7	t25, 5	9. 629*n*	0. 393	+1. 77	−19. 0
23	14 46 20	10 14 28. 70	+32 51 58. 8	+1 29. 17	−1 56. 2	t25, 5	9. 615*n*	0. 341	+1. 81	−20. 0
1926										
Jan. 16	13 44 39	11 57 22. 67	+53 44 30. 1	+1 22. 40	−3 55. 2	t25, 5	9. 670*n*	0. 060n	−0. 16	−12. 0
Feb. 5	12 13 21	11 50 26. 16	+59 16 19. 0	−2 22. 47	+2 42. 2	t25, 5	9. 748*n*	0. 253n	+0. 81	−11. 0

SCHORR (1918 d)

1918										
Nov. 29	14 45 26	4 7 37. 63	+11 47 47. 4	+1 44. 43	−4 1. 2	t30, 6	9. 539	0. 648	+5. 44	+12. 7
30	10 42 29	4 7 4. 23	+11 49 47. 2	+1 11. 03	−2 1. 4	t50, 10	8. 985*n*	0. 603	+5. 44	+12. 7
Dec. 2	11 56 54	4 5 42. 32	+11 55 6. 5	−0 10. 90	+3 18. 1	d10, 10	8. 865	0. 600	+5. 46	+12. 5

BRORSEN (1919 b)

1919										
Aug. 22	11 48 19	22 46 16. 97	+28 50 46. 4	−0 2. 17	−0 35. 7	d12, 10	9. 103*n*	0. 206	+4. 31	+23. 5
23	12 6 19	22 43 39. 03	+31 4 2. 9	−3 6. 94	−1 11. 9	t25, 5	8. 865*n*	0. 081	+4. 34	+23. 4
28	14 0 58	22 21 27. 64	+45 30 15. 5	−3 20. 49	−0 28. 4	t35, 7	9. 530	9. 510n	+4. 53	+23. 9
Sept. 2	10 50 56	21 17 47. 76	+64 41 51. 6	−0 21. 49	+4 27. 4	d12, 10	8. 926	0. 583n	+4. 49	+26. 5
13	8 45 5	12 46 56. 22	+58 21 22. 7	+0 18. 33	+0 39. 8	d12, 10	9. 909	0. 701	−0. 04	− 8. 4

BORRELLY (1918 e) = (1925 f)

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
6 18 22.60	− 2 40 5.9	AG Straszburg 2061	3	26	183	Bn.	Nebulous. Moonlight. Haze.
6 30 48.84	+ 1 52 54.6	AG Albany 2272	4	26	183	Bn.	Visible in 5-in. Nucleus fairly well defined.
6 40 24.75	+ 6 26 27.4	AG Leipzig II 3188	3	26	183	Bn.	Ft. at times. Stopped by haze.
6 53 57.88	+21 43 45.1	Ast Par +21°.0652, 295; +22°.0656. 435	4	26	183	B.	Nucleus 10½m.
6 58 15.42	+21 55 39.7	Ast Par +23°0700, 620; +22°.0656, 650; +21°0700, 28.	4	26	367	B.	Head about 6″ in diameter.
6 59 33.89	+46 7 52.7	AG Bonn 5728; Ast Hel +46°.0700, 67	4	26	183	B.	11m. Brt. moonlight.
6 58 26.53	+47 2 36.4	Comp. with AG Bonn 5711	2	26	183	B.	Brt. moonlight.
6 52 37.35	+54 12 56.9	AG Harvard 2680	3	26	183	B.	10m. "
6 43 42.24	+60 58 1.2	Ast Rome +60°.0640, 17663; +61°.0648, 17304; +62°.0640, 16504.	2	26	183	B.	Transits poor.
6 38 24.09	+62 4 58.3	AG Hels 4687	4	26	183	B.	Transits poor. Windy.
6 36 8.57	+62 52 20.0	AG Hels 4652	2	26	183	B.	Moonlight.
6 30 23.10	+64 48 9.9	AG Hels 4594; AG Christiania 1062	3	26	183	B.	
6 28 5.60	+65 4 50.2	Ast Gr +65°.0627, 2179	3	26	183	B.	
6 31 16.53	+66 13 54.1	AG Christiania 1063	2	26	183	B.	12½m.
6 59 36.17	+64 43 50.1	AG Hels 4878	2	26	183	B.	13m. Transits very poor.
7 0 58.62	+64 29 43.3	AG Hels 4892	3	26	183	B.	13m.
7 50 35.77	+60 21 50.2	AG Hels 5292	4	26	183	B.	13½m. Poor obsn.
8 58 13.99	+52 56 1.3	Comp. with AG Harvard 3270	3	26	183	B.	14m. Poor obsn.
9 54 54.82	+30 36 58.4	Greenwich (+24° to +32°) 4907	3	26	183	Bn.	
10 4 37.92	+31 42 53.1	Greenwich (+24° to +32°) 4967	3	26	183	Bn.	
10 12 57.72	+32 54 15.0	AG Leiden 4129	3	26	183	Bn.	Barely visible in 5-inch finder.
11 56 0.43	+53 48 37.3	Yale (+50° to 55°) 3969	3	26	183	Bn.	12m. Catalog proper motion not applied.
11 52 47.82	+59 13 47.8	AG Helsingfors-Gotha 6959	2	26	183	Bn.	Ft.

SCHORR (1918 d)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
4 5 47.76	+11 51 35.9	AG Leipzig I 1221	5	26	183	Bn.	V. ft. Delayed by clds. Poor obsn.
4 5 47.76	+11 51 35.9	AG Leipzig I 1221	4	26	183	Bn.	Ft. Nebulous.
4 5 47.76	+11 51 35.9	AG Leipzig I 1221	4	26	183	Bn.	

BRORSEN (1919 b)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
22 46 14.83	+28 50 58.6	AG Cambridge 13735	4	26	183	B.	Stellar nucleus 12m. Diffused nebulosity extends 10′.
22 46 41.63	+31 4 51.4	AG Leiden 9696	4	26	183	Bn.	Ft. nucleus. Faintly visible in 5-in. Haze.
22 24 43.60	+45 30 20.0	AG Bonn 16754	3	26	183	Bn.	Ft. nucleus. Visible in 2-in.
21 18 4.76	+64 36 57.7	Ast Gr +65°.2109, 7304; Ast Rom +64°.2118, 23302.	4	26	183	B.	Poor obsn.
12 46 37.93	+58 20 51.3	Comp. with AG Hels 7337	4	26	183	B.	Probably visible to naked eye. V. diffuse. Head 20″ in diameter.

METCALF-BORRELLY (1919 c)

Date	W. M. T.	Apparent Place of Comet		Comet—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
1919	h m s	h m s	° ′ ″	m s	′ ″				s	″
Aug. 25	10 3 10	14 7 54. 01	+25 59 10. 9	+2 13. 55	+9 41. 8	t35, 7	9. 706	0. 704	+1. 86	− 0. 5
26	8 42 19	14 9 22. 41	+25 36 28. 0	+0 9. 06	−2 53. 8	d9, 8	9. 684	0. 609	+1. 86	− 0. 3
28	9 16 15	14 12 36. 28	+24 47 15. 1	−0 46. 04	−5 5. 9	t30, 10	9. 698	0. 663	+1. 85	− 0. 2
Sept. 2	8 38 0	14 20 53. 29	+22 43 26. 6	+0 24. 37	−3 3. 3	d12, 10	9. 681	0. 644	+1. 85	− 0. 3
12	8 8 14	14 38 59. 60	+18 22 45. 1	−0 19. 33	−1 39. 4	d12, 10	9. 664	0. 662	+1. 89	− 0. 6
24	7 47 7	15 3 24. 26	+12 47 18. 3	+0 8. 45	−0 44. 4	d10, 8	9. 653	0. 693	+1. 95	− 0. 3
Oct. 3	7 35 0	15 23 41. 94	+ 8 20 0. 2	−0 20. 24	+4 7. 3	d10, 8	9. 648	0. 714	+2. 04	+ 0. 1

FINLAY (1919 d)

Date	W. M. T.	α	δ	α	δ	Comp.	α	δ	α	δ
1919										
Nov. 13	7 46 51	23 4 9. 19	− 8 11 29. 5	+1 6. 18	−4 2. 7	t25, 5	8. 347	0. 807	+3. 99	+25. 8
17	7 37 8	23 37 3. 89	− 3 19 30. 9	−0 4. 26	−1 29. 3	d10, 8	8. 501n	0. 770	+4. 09	+26. 9
22	7 51 11	0 14 24. 30	+ 2 15 49. 3	+2 37. 61	+0 13. 0	t35, 7	8. 589n	0. 718	+4. 24	+27. 5
24	7 47 23	0 27 56. 12	+ 4 15 19. 6	+1 15. 69	+1 1. 3	t40, 8	8. 761n	0. 697	+4. 32	+27. 3
Dec. 15	8 7 54	2 10 9. 55	+17 14 23. 0	−0 11. 13	−0 49. 7	d10, 8	8. 760n	0. 510	+5. 04	+23. 1
20	8 12 49	2 26 52. 15	+18 50 57. 6	−0 24. 57	−5 24. 1	d10, 8	8. 618n	0. 477	+5. 17	+21. 7
22	8 3 34	2 33 1. 91	+19 23 57. 4	+0 18. 85	+1 17. 2	d10, 8	8. 759n	0. 466	+5. 21	+21. 2

NOTE.—Nov. 17. AG Straszburg 8117; Abbadia C 7318; Ast Fer −3°2332, 217; −3°2340, 8; −3°2336, 107. Used ½ [Ast +½ (AG+Abb)].

TEMPEL II (1920 b)=(1925 d)

Date	W. M. T.	α	δ	α	δ	Comp.	α	δ	α	δ
1920										
July 26	14 59 57	2 7 14. 55	− 1 32 51. 8	−0 13. 07	−2 59. 5	d10, 8	9. 487n	0. 751	+2. 50	+15. 2
Sept. 13	14 14 6	3 2 15. 09	− 7 54 4. 6	+0 16. 75	−2 50. 0	d10, 8	9. 179n	0. 802	+3. 41	+18. 4
14	14 6 15	3 2 9. 95	− 8 4 21. 8	−1 45. 22	+3 52. 7	t50, 10	9. 199n	0. 803	+3. 41	+18. 3
17	14 27 26	3 1 35. 97	− 8 35 21. 6	+0 16. 20	−0 31. 9	d10, 8	8. 968n	0. 809	+3. 48	+18. 5
Oct. 9	14 42 55	2 46 6. 62	−11 39 51. 4	−0 11. 58	+7 43. 8	d10, 8	9. 156	0. 827	+3. 91	+19. 2
Nov. 4	11 14 37	2 17 37. 23	−11 59 6. 4	+0 42. 60	−1 0. 3	d10, 8	8. 121n	0. 833	+4. 21	+18. 0
1925										
June 16	11 29 47	18 25 44. 35	− 0 37 41. 6	−1 56. 31	+2 31. 3	t25, 5	9. 174n	0. 746	+1. 88	+ 5. 8
19	11 53 42	18 26 57. 46	− 1 17 24. 3	+1 44. 20	−1 32. 4	t25, 5	8. 918n	0. 752	+1. 92	+ 6. 3
July 18	12 11 48	18 43 36. 01	−15 11 29. 7	−1 20. 92	+2 36. 8	t25, 5	9. 178	0. 846	+2. 30	+ 8. 9
22	11 31 23	18 47 53. 91	−17 57 39. 4	+2 9. 40	+3 41. 8	t25, 5	8. 973	0. 864	+2. 36	+ 8. 7

NOTE.—July 18. Fan-shaped appearance toward nw., opposite in direction to comet's motion.

TAYLOR-SKJELLERUP (1920 c)

Date	W. M. T.	α	δ	α	δ	Comp.	α	δ	α	δ
1920										
Dec. 20	14 33 57	9 31 22. 69	+ 1 7 59. 7	−1 52. 43	+2 30. 8	t35, 7	9. 066n	0. 730	+4. 37	−23. 7
1921										
Jan. 18	14 46 30	11 4 32. 21	+35 3 9. 6	+0 16. 32	−5 12. 8	d10, 8	8. 792n	9. 768	+1. 53	−18. 9
Feb. 14	12 17 27	11 14 44. 63	+45 57 7. 2	−0 2. 55	−1 29. 6	d10, 8	9. 344n	9. 912n	+2. 24	−18. 4

METCALF-BORRELLY (1919 c)

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
14 5 38. 60	+25 49 29. 6	AG Cambridge 6732	5	26	183	B.	11½m. Very hazy. Poor obsn. Hurried.
14 9 11. 49	+25 39 22. 1	AG Cambridge 6752	5	26	183	Bn.	Ft. nucleus. Visible in 2-in. Poor obsn.
14 13 20. 47	+24 52 21. 2	AG Berlin B 5032; AG Cambridge 6780	4	26	388	Bn.	Visible in 2-in.
14 20 27. 07	+22 46 30. 2	Ast Par +22°1416, 73; +22°1424, 4	5	26	183	B.	Ft. at times. Clds. Moonlight. Poor obsn.
14 39 17. 04	+18 24 25. 1	Cinc Pub No. 18: IV 1940	5	26	183	B.	
15 3 13. 86	+12 48 3. 0	Comp. with AG Leipzig I 5315	4	26	183	B.	
15 24 0. 14	+ 8 15 52. 8	Ast Tou +9°1524, 124	4	26	183	B.	Poor obsn.
FINLAY (1919 d)							
23 2 59. 02	− 8 7 52. 6	AG Wien-Ottakring 8217	4	26	183	B.	Brightness 9m. Diffuse. Transits very poor.
23 37 4. 06	− 3 18 28. 5		3	26	183	B.	Hazy.
0 11 42. 45	+ 2 15 8. 8	AG Albany 35	4	26	183	B.	Poor obsn.
0 26 36. 11	+ 4 13 51. 0	Cinc Pub No 18: IV 57	3	26	183	B.	Haze. Poor transits.
2 10 15. 64	+17 14 49. 6	AG Berlin A 625	4	26	183	B.	Clds.
2 27 11. 55	+18 56 0. 0	AG Berlin A 692	3	26	183	B.	Ft. Haze. Used step star.
2 32 37. 85	+19 22 19. 0	Comp. with AG Berlin A 715	4	26	183	B.	Ft. Diffuse. Haze. Poor obsn.
TEMPEL II (1920 b) = (1925 d)							
2 7 25. 12	− 1 30 7. 5	Ast Alg −1°0204, 95; −2°0208, 14	4	26	183	B.	10m. Clds.
3 1 54. 93	− 7 51 33. 0	Comp. with PGC Boss 700	3	26	183	B.	Ft. Haze. Poor obsn.
3 3 51. 76	− 8 8 32. 8	Comp. with AG Wien-Ottakring 710	5	26	183	B.	Very poor obsn.
3 1 16. 29	− 8 35 8. 2	AG Wien-Ottakring 699	3	26	183	B.	
2 46 14. 29	−11 47 54. 4	Comp. with AG Harvard 648	4	26	183	B.	Ft. Haze. Very poor obsn.
2 16 50. 42	−11 58 24. 1	AG Harvard 525	4	26	183	B.	V. ft. and diffuse. Haze. V. poor obsn. Used step star 12½m.
18 27 38. 78	− 0 40 18. 7	Abbadia B (+4°à−2°) 10086	4	26	183	Bn.	10m. Barely visible in 5-in. Stellar nucleus.
18 25 11. 34	− 1 15 58. 2	Abbadia B (+4°à−2°) 10056	4	26	183	Bn.	
18 44 54. 63	−15 14 15. 4	AG Washington 6940	2	26	183	Bn.	Visible in 2-inch finder.
18 45 42. 15	−18 1 29. 9	AG Washington 6947	4	26	183	Bn.	Stellar nucleus.
TAYLOR-SKJELLERUP (1920 c)							
9 33 10. 75	+ 1 5 52. 6	AG Albany 3826	2	26	183	B.	10m.
11 4 14. 36	+35 8 41. 3	AG Lund 5132	2	26	183	B.	11½m.
11 14 44. 94	+45 58 55. 2	AG Bonn 7982	2	26	183	B.	13½m. Ft.

REID (1921 a)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1921	h m s	h m s	° ′ ″	m s	′ ″				s	″
Mar. 22	16 51 55	20 19 19. 53	−13 47 27. 6	−0 14. 56	−1 14. 3	d10, 8	9. 566n	0. 803	+0. 55	+ 6. 5
26	16 54 2	20 21 33. 78	−10 56 33. 5	+0 24. 54	+1 28. 5	d12, 8	9. 536n	0. 798	+0. 64	+ 6. 0
28	15 54 50	20 22 39. 44	− 9 21 31. 8	−0 12. 72	+2 23. 0	d10, 8	9. 606n	0. 776	+0. 68	+ 5. 7
Apr. 1	16 10 57	20 24 55. 88	− 5 37 47. 8	−1 28. 15	+1 24. 8	t40, 8	9. 566n	0. 769	+0. 77	+ 4. 8
May 9	10 12 27	3 1 38. 43	+85 25 21. 7	−0 10. 29	−0 25. 4	d10, 8	0. 383	0. 822	−4. 25	− 1. 7
16	11 20 42	7 25 35. 56	+74 5 18. 8	−1 4. 93	+1 37. 3	d10, 8	0. 185	0. 612	+0. 15	+ 2. 6
20	11 59 20	7 44 22. 25	+68 14 35. 3	−0 54. 52	−0 15. 3	d10, 8	0. 019	0. 734	+0. 39	+ 1. 3
31	11 26 18	8 2 17. 54	+57 13 24. 3	+0 4. 51	−0 12. 9	d10, 8	9. 864	0. 769	+0. 55	− 1. 7

PONS-WINNECKE (1921 b)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1921										
May 9	11 32 43	17 26 20. 72	+45 49 38. 1	+1 12. 67	−1 19. 6	t35, 7	9. 634n	9. 075	+2. 38	− 3. 9
16	12 50 32	18 6 33. 25	+46 29 9. 0	+1 24. 71	+2 31. 6	t40, 8	9. 441n	9. 864n	+2. 47	− 2. 4
31	13 19 59	20 18 58. 32	+39 23 20. 0	+0 31. 47	+1 49. 1	d10, 8	9. 536n	9. 851	+2. 51	+ 1. 0
June 14	15 10 31	22 44 34. 63	+11 14 9. 3	+2 2. 11	−5 16. 2	t30, 6	9. 373n	0. 627	+2. 20	+ 9. 3

DUBIAGO (1921 c)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1921										
May 25	9 59 36	9 22 42. 47	+37 34 33. 8	+0 22. 70	−1 34. 9	d10, 12	9. 740	0. 490	+1. 18	− 4. 7
31	9 53 18	9 55 9. 20	+33 58 19. 2	+3 57. 54	−2 44. 5	t30, 6	9. 710	0. 500	+1. 22	− 5. 2

GRIGG-SKJELLERUP (1922 b) = GRIGG (1902 c)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1922										
May 23	9 8 8	8 26 49. 68	+25 31 9. 7	−1 23. 22	−3 34. 6	t25, 5	9. 681	0. 603	+0. 59	− 8. 2
24	9 13 50	8 32 46. 31	+26 34 45. 2	−0 21. 02	+4 15. 3	d10, 8	9. 687	0. 600	+0. 60	− 7. 9
29	10 21 23	9 7 11. 60	+32 17 51. 6	+2 7. 22	−8. 47. 9	t35, 7	9. 732	0. 639	+0. 64	− 5. 5
31	9 23 14	9 23 1. 19	+34 38 28. 5	−0 9. 47	+4 30. 9	d10, 10	9. 714	0. 494	+0. 67	− 4. 4
June 21	12 9 18	13 45 9. 25	+47 50 14. 4	+0 17. 49	−0 1. 2	d11, 8	9. 793	0. 203	+1. 45	+ 9. 0

BAADE (1922 c)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1922										
Oct. 24	8 58 13	19 57 58. 06	+36 18 59. 4	+0 4. 36	− 3 58. 2	d10, 8	9. 623	0. 231	+1. 84	+32. 6
25	9 26 19	20 0 16. 41	+36 1 20. 9	−0 33. 30	−11 29. 8	d10, 8	9. 667	0. 332	+1. 85	+32. 7
26	10 10 38	20 2 37. 12	+35 43 31. 4	−0 52. 62	− 2 25. 6	d10, 8	9. 714	0. 460	+1. 86	+32. 7
27	9 47 45	20 4 52. 76	+35 26 26. 8	+0 23. 34	− 3 36. 0	d10, 8	9. 692	0. 411	+1. 86	+32. 6
30	9 34 23	20 11 49. 85	+34 34 32. 4	+0 25. 43	− 4 48. 2	d10, 8	9. 679	0. 405	+1. 86	+32. 5
Nov. 8	8 48 6	20 33 20. 28	+31 59 30. 8	−0 31. 56	− 5 43. 3	d12, 8	9. 623	0. 378	+1. 93	+32. 5

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
REID (1921 a)							
h m s	° ′ ″			in.			
20 19 33. 54	−13 46 19. 8	Comp. with AG Harvard 7195; AG Wa 7673.	5	26	183	B.	
20 21 8. 60	−10 58 8. 0	Comp. with AG Harvard 7191	4	26	183	B.	Ft. Wires fluctuating. Clds. Twilight. Hurried. V. poor obsn.
20 22 51. 48	− 9 24 0. 5	AG Wien-Ottakring 7256	5	26	183	B.	10^m.
20 26 23. 26	− 5 39 17. 4	Ast Fer −5°2028, 75; −6°2024, 129	4	26	183	B.	Transits poor.
3 1 52. 97	+85 25 48. 8	Comp. with Ast Gr Vol III 734	3	26	183	B.	
7 26 40. 34	+74 3 38. 9	Ast Gr +74°0736, 3031; +75°0715, 3031	3	26	183	B.	7^m.
7 45 16. 38	+68 14 49. 3	Gr Ast Vol III 12728	3	26	183	B.	Brt. moonlight. Haze.
8 2 12. 48	+57 13 38. 9	Comp. with AG Hels-Gotha 5324	4	26	183	B.	
PONS-WINNECKE (1921 b)							
17 25 5. 67	+45 51 1. 6	AG Bonn 11199	4	26	183	B.	
18 5 6. 07	+46 26 39. 8	AG Bonn 11722	3	26	183	B.	
20 18 24. 34	+39 21 29. 9	AG Lund 9293	3	26	183	B.	
22 42 30. 32	+11 19 16. 2	AG Leipzig I 9089	3	26	183	B.	Bad obsn.
DUBIAGO (1921 c)							
9 22 18. 59	+37 36 13. 4	Comp. with AG Lund 4608	3	26	183	B.	Poor obsn. Clds.
9 51 10. 44	+34 1 8. 9	AG Leiden 4011	3	26	183	B.	Poor obsn.
GRIGG-SKJELLERUP (1922 b) = GRIGG (1902 c)							
8 28 12. 31	+25 34 52. 5	AG Cambridge 4574	3	26	183	B.	12^m. V. poor obsn. Diffuse. Ft. Clds.
8 33 6. 73	+26 30 37. 8	AG Cambridge 4612	3	26	183	B.	12^m. Ft.
9 5 3. 74	+32 26 45. 0	AG Leiden 3777	3	26	183	B.	10^m. Visible in 2-in finder. Poor obsn.
9 23 9. 99	+34 34 2. 0	Comp. with AG Leiden 3888; AG Lund 4647.	4	26	183	B.	V. faint. Clds. and moonlight.
13 44 50. 31	+47 50 6. 6	Comp. with AG Bonn 9082	4	26	183	B.	Visible in 5-inch. Ft. Poor obsn.
BAADE (1922 c)							
19 57 51. 86	+36 22 25. 0	AG Lund 8930	3	26	183	Hl.	9^m. Coma. Not visible in 5-inch.
20 0 47. 86	+36 12 18. 0	AG Lund 8974	3–4	26	183	Hl.	10^m. Coma. Visible in 5-inch at first.
20 3 27. 88	+35 45 24. 3	Boss PGC 5157	3–4	26	183	Hl.	11^m. Coma. Visible at first in 5-inch.
20 4 27. 56	+35 29 30. 2	AG Lund 9036	4	26	183	Hl.	10^m. Not sure of seeing in 5-inch. Windy.
20 11 22. 56	+34 38 48. 1	AG Leiden 8082	3	26	183	Hl.	11^m. Coma. Moonlight.
20 33 49. 91	+32 4 41. 6	AG Leiden 8350	4	26	183	Hl.	10^m. Windy. Haze. Ft. star close by when pointings were begun.

BAADE (1922 c)—Continued

Date	W. M. T.	Apparent Place of Comet		Comet—Star		Comp.	Log pp		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
1922	h m s	h m s	° ′ ″	m s	′ ″				s	″
Nov. 10	7 55 33	20 38 9. 47	+31 25 59. 9	+0 24. 44	+ 2 21. 3	d10, 8	9. 525	0. 280	+1. 94	+32. 4
10	9 9 17	20 38 16. 83	+31 25 7. 3	−0 5. 82	− 7 26. 2	d10, 10	9. 653	0. 440	+1. 95	+32. 4
15	9 49 19	20 50 43. 56	+30 0 28. 1	+1 30. 76	− 4 2. 6	t20, 4	9. 693	0. 549	+1. 96	+32. 0
16	8 22 29	20 53 17. 24	+29 44 29. 1	−0 14. 09	−10 30. 6	d10, 8	9. 590	0. 395	+1. 99	+32. 1
21	8 4 15	21 5 33. 47	+28 23 43. 3	+0 15. 74	− 6 18. 5	d10, 8	9. 565	0. 403	+2. 04	+31. 8
Dec. 6	7 48 49	21 43 9. 46	+24 40 35. 8	0 17. 02	− 5 59. 6	d10, 8	9. 562	0. 481	+2. 18	+30. 3
8	6 25 9	21 47 59. 67	+24 14 27. 1	−0 18. 99	− 5 16. 8	d10, 8	9. 345	0. 396	+2. 20	+30. 1
13	7 34 32	22 0 28. 78	+23 9 33. 4	+0 20. 56	− 7 37. 3	d10, 8	9. 549	0. 500	+2. 22	+29. 3
26	7 19 24	22 31 55. 38	+20 45 20. 8	−0 9. 62	+ 1 49. 8	d10, 8	9. 550	0. 540	+2. 34	+27. 3
29	7 57 2	22 39 4. 83	+20 16 29. 9	−0 9. 16	+ 9 31. 0	d10, 8	9. 612	0. 588	+2. 36	+26. 7
1923										
Jan. 5	6 57 35	22 55 15. 86	+19 16 48. 2	+0 1. 62	− 1 19. 8	d11, 10	9. 536	0. 555	−0. 52	+ 6. 5
12	7 1 54	23 11 9. 13	+18 25 36. 0	−3 4. 75	+ 7 4. 9	t20, 5	9. 562	0. 580	−0. 51	+ 4. 7
17	6 38 47	23 22 12. 87	+17 54 19. 4	+0 11. 15	− 5 35. 0	d10, 8	9. 535	0. 575	−0. 50	+ 3. 8
22	7 5 23	23 33 8. 98	+17 26 48. 3	−0 3. 90	+ 5 54. 3	d10, 8	9. 590	0. 607	−0. 51	+ 2. 6
Feb. 16	7 27 21	0 24 39. 64	+15 58 33. 0	+0 2. 84	+ 0 6. 0	d10, 10	9. 654	0. 671	−0. 51	− 1. 9
Sept. 17	16 20 43	4 43 48. 65	+ 2 22 48. 6	−0 2. 17	+ 4 16. 7	d13, 11	8. 877n	0. 717	+2. 16	+ 3. 5
Nov. 9	12 53 15	4 26 18. 36	− 6 39 14. 5	−0 11. 98	+ 1 46. 1	d12, 12	8. 593n	0. 796	+3. 27	+ 3. 8
Dec. 1	11 32 7	4 11 52. 24	− 9 8 15. 9	−0 4. 62	− 1 39. 4	d12, 12	6. 731	0. 814	+3. 50	+ 1. 5

SKJELLERUP (1922 d)

Date	W. M. T.	α	δ	Comet—Star α	Comet—Star δ	Comp.	Log pp α	Log pp δ	Star to App. Place α	Star to App. Place δ
1922										
Dec. 5	15 51 33	11 51 28. 52	−19 48 16. 0	+0 18. 44	− 4 28. 0	d10, 8	9. 541n	0. 832	+2. 62	− 9. 3

ENCKE (1924 b)

Date	W. M. T.	α	δ	Comet—Star α	Comet—Star δ	Comp.	Log pp α	Log pp δ	Star to App. Place α	Star to App. Place δ
1924										
Sept. 3	14 56 57	5 42 36. 33	+36 31 33. 5	+0 19. 81	− 6 0. 1	d10, 8	9. 684n	0. 356	+1. 50	−10. 8
Oct. 2	16 12 50	9 55 52. 76	+25 52 42. 7	−0 9. 67	− 6 58. 6	d10, 8	9. 689n	0. 615	+0. 54	−10. 6
3	16 25 16	10 5 1. 26	+24 45 33. 9	+0 10. 50	− 2 3. 0	d10, 8	9. 680n	0. 614	+0. 53	−10. 3
6	16 7 58	10 31 8. 45	+21 14 50. 5	+0 18. 99	− 3 6. 2	d10, 8	9. 684n	0. 672	+0. 50	− 9. 2
6	16 30 36	10 31 16. 37	+21 13 39. 6	+0 1. 42	+ 2 17. 1	d10, 9	9. 674n	0. 649	+0. 50	− 9. 1
8	16 22 22	10 47 50. 95	+18 45 36. 1	+0 5. 12	− 3 7. 4	d10, 8	9. 675n	0. 679	+0. 49	− 8. 3
8	16 37 16	10 47 55. 99	+18 44 49. 8	+0 0. 17	+ 0 58. 7	d10, 8	9. 668n	0. 666	+0. 49	− 8. 3
9	16 40 7	10 56 0. 05	+17 28 53. 6	−0 8. 94	− 6 7. 5	d10, 8	9. 666n	0. 674	+0. 48	− 7. 9
9	16 56 1	10 56 5. 37	+17 28 2. 7	−0 12. 01	− 2 28. 5	d10, 8	9. 657n	0. 661	+0. 48	− 7. 9
10	16 48 25	11 3 55. 84	+16 11 56. 4	+0 34. 41	− 3 28. 8	d10, 8	9. 661n	0. 677	+0. 48	− 7. 5
10	17 3 17	11 4 0. 40	+16 11 18. 0	−0 30. 50	+ 0 1. 5	d10, 8	9. 652n	0. 667	+0. 47	− 7. 4
13	16 43 38	11 26 37. 59	+12 20 11. 9	+2 31. 63	− 3 13. 1	t30, 6	9. 661n	0. 705	+0. 47	− 6. 4
14	16 48 14	11 33 56. 33	+11 2 18. 0	−0 6. 99	+ 2 17. 7	d10, 8	9. 658n	0. 709	+0. 47	− 5. 9
15	16 52 3	11 41 7. 82	+ 9 44 28. 1	−0 24. 85	− 4 15. 0	d10, 9	9. 656n	0. 714	+0. 47	− 5. 5
16	17 8 40	11 48 16. 44	+ 8 26 0. 6	+0 17. 42	− 7 28. 7	d10, 8	9. 648n	0. 713	+0. 48	− 5. 2
17	17 11 12	11 55 15. 47	+ 7 8 36. 0	+0 31. 81	+ 1 10. 1	d10, 8	9. 647n	0. 718	+0. 49	− 4. 9
20	17 1 33	12 15 43. 75	+ 3 18 40. 1	+0 28. 16	− 3 22. 3	d10, 8	9. 653n	0. 733	+0. 53	− 4. 0
21	17 31 8	12 22 38. 30	+ 2 0 53. 3	−0 28. 80	+ 1 20. 1	d10, 8	9. 639n	0. 734	+0. 54	− 3. 6
22	17 14 32	12 29 19. 60	+ 0 45 56. 1	−0 23. 50	+ 1 48. 1	d12, 8	9. 649n	0. 739	+0. 55	− 3. 3

NOTES.—Oct. 21. Has 20′ tail (hour angle= $-4^{h}\ 49^{m}$) at p=303°.

BAADE (1922 c)—Continued

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
20 37 43. 09	+31 23 6. 2	Ast Oxf +31°2037, 60714	3	26	183	Hl.	10ᵐ. Coma. Diffuse.
20 38 20. 70	+31 32 1. 1	AG Leiden 8410	3	26	183	Hl.	Haze at the last, becoming ft.
20 49 10. 84	+30 3 58. 7	AG Cambridge 11863	4	26	183	Hl.	V. ft. at times. Clouded.
20 53 29. 34	+29 54 27. 6	AG Cambridge 11933	3	26	183	Hl.	11ᵐ. Coma.
21 5 15. 69	+28 29 30. 0	Ast Oxf +28°2100, 63232; +28°2109, 63961; +29°2104, 60903.	3	26	183	B.	Could just see in 5-inch.
21 43 24. 30	+24 46 5. 1	Ast Oxf +25°2140, 74527; Ast Par +24°2144, 116.	3	26	183	B.	Visible in 5-inch.
21 48 16. 46	+24 19 13. 8	Abbadia A (+16°à+24°) 12937	4	26	183	B.	10ᵐ. Visible in 5-inch.
22 0 6. 00	+23 16 41. 4	Ast Par +23°2156, 253; +24°2200, 312	2	26	183	B.	Visible in 5-inch.
22 32 2. 66	+20 43 3. 7	Ast Par +21°2228, 400	3	26	183	B.	Moonlight.
22 39 11. 63	+20 6 32. 2	Abbadia A (+16°à+24°) 13422	4	26	183	B.	Moonlight.
22 55 14. 76	+19 18 1. 5	Comp. with Abbadia A (+16°à+24°)13624	3	26	183	B.	Clds., Ft.
23 14 14. 39	+18 18 26. 4	Abbadia A (+16°à+24°) 13763	4	26	183	B.	Windy.
23 22 2. 22	+17 59 50. 6	Ast Bor +17°2324, 13	2	26	183	B.	
23 33 13. 39	+17 20 51. 4	Abbadia A (+16°à+24°) 13946	4	26	183	B.	Ft. Moonlight. Haze.
0 24 37. 31	+15 58 28. 9	Ast Bor +15°0020, 46; +16°0024, 166	4	26	183	B.	
4 43 48. 66	+ 2 18 28. 4	Comp. with Albany 1396	2	26	183	B.	V. ft. last half.
4 26 27. 07	− 6 41 4. 4	Ast Fer −6°0424, 159	2	26	183	B.	13½ᵐ. V. ft.
4 11 53. 36	− 9 6 38. 0	Comp. with AG Wien-Ottakring 1053	2	26	183	B.	14ᵐ. V. ft.

SKJELLERUP (1922 d)

11 51 7. 46	−19 43 38. 7	Ast Hyd −19°1148, 37188; −20°1152, 42922.	4	26	183	B.	Brt. moonlight.

ENCKE (1924 b)

5 42 15. 02	+36 37 44. 4	AG Lund 2924	2	26	183	B.	13ᵐ. Diffuse. Poor obsn.
9 56 1. 89	+25 59 51. 9	Ast Oxf +26°0952, 27485; +27°0956, 25119.	2	26	183	B.	
10 4 50. 23	+24 47 47. 2	Ast Par +24°1000, 70; Ast Oxf +25°1004, 36655.	2	26	183	B.	
10 30 48. 96	+21 18 5. 9	Ast Par +21°1028, 36; +22°1032, 102	2	26	183	B.	
10 31 14. 45	+21 11 31. 6	Ast Par +21°1028, 39; +22°1032, 105	2	26	183	B.	
10 47 45. 34	+18 48 51. 8	Comp. with Abbadia A 6171	4	26	183	B.	
10 47 55. 33	+18 43 59. 4	Comp. with PGC Boss 2914	4	26	183	B.	
10 56 8. 51	+17 35 9. 0	Ast Bor +17°1052, 44	4	26	183	B.	
10 56 16. 90	+17 30 39. 1	Ast Bor +17°1052, 45	4	26	183	B.	
11 3 20. 95	+16 15 32. 7	Ast Bor +16°1104, 12	5	26	183	B.	
11 4 30. 43	+16 11 23. 9	Ast Bor +16°1104, 21; +17°1100,109	5	26	183	B.	Twilight.
11 24 5. 49	+12 23 31. 4	AG Leipzig I 4297	4	26	183	B.	
11 34 2. 85	+11 0 6. 2	Ast Tou +11°1132, 57	3	26	183	B.	8ᵐ. Thick haze.
11 41 32. 20	+ 9 48 48. 6	Ast Tou +9°1140, 46; +11°1140, 169	2	26	183	B.	Twilight. Haze. Ft. at times.
11 47 58. 54	+ 8 33 34. 5	Ast Tou +9°1148, 102	4	26	183	B.	Twilight. Star ft.
11 54 43. 17	+ 7 7 30. 8	Ast Tou +7°1156, 6	3	26	183	B.	Twilight. Star ft.
12 15 15. 06	+ 3 22 6. 4	Comp. with Abbadia B 7235	4	26	183	B.	
12 23 6. 56	+ 1 59 36. 8	C. w. AG Albany 4492 and Abbadia B 7295.	5	26	183	B.	Twilight. Star ft.
12 29 42. 55	+ 0 44 11. 3	Ast Alg 0°1232, 5	4	26	183	B.	Twilight.

Date	W. M. T.	Apparent Place of Comet		Comet—Star		Comp.	Log $p\rho$		Star to App. Place	
		α	δ	α	δ		α	δ	α	δ
FINSLER (1924 c)										
1924	h m s	h m s	° ′ ″	m s	′ ″				s	″
Sept. 23	7 25 20	14 21 11. 18	+ 5 39 13. 9	−2 17. 26	+ 2 22. 1	t30, 6	9. 654	0. 727	+0. 46	+ 4. 8
24	7 6 46	14 26 41. 73	+ 4 18 21. 8	−0 7. 19	+ 3 28. 4	d10, 8	9. 643	0. 727	+0. 48	+ 4. 7
Oct. 1	6 51 3	14 57 4. 81	− 3 39 16. 3	−0 7. 64	+ 8 28. 5	d10, 9	9. 631	0. 752	+0. 60	+ 4. 5
2	6 43 39	15 0 29. 88	− 4 35 24. 6	+0 13. 47	+ 4 1. 6	d12, 8	9. 626	0. 756	+0. 62	+ 4. 5
3	6 36 19	15 3 44. 86	− 5 29 4. 4	+0 7. 25	− 5 14. 3	d10, 8	9. 621	0. 759	+0. 63	+ 4. 5
8	6 32 6	15 18 2. 09	− 9 25 31. 1	+0 14. 23	− 3 23. 1	d14, 8	9. 626	0. 770	+0. 70	+ 4. 1
9	6 33 59	15 20 33. 80	−10 7 9. 5	−0 25. 19	− 3 29. 0	d10, 8	9. 630	0. 770	+0. 71	+ 4. 1
10	6 32 48	15 23 0. 01	−10 47 4. 9	−0 22. 62	− 5 19. 3	d10, 8	9. 631	0. 772	+0. 71	+ 4. 1
11	6 37 8	15 25 21. 60	−11 25 36. 8	+0 5. 53	+ 2 27. 1	d14, 12	9. 636	0. 771	+0. 72	+ 4. 0
13	6 34 26	15 29 50. 39	−12 38 7. 6	+0 32. 23	− 5 48. 3	d4, 4	9. 639	0. 772	+0. 72	+ 4. 0
SCHAIN-COMAS SOLÃ (1925 a)										
1925										
Mar. 25	10 43 45	11 43 49. 88	+ 1 54 37. 2	+0 30. 24	− 0 55. 6	d10, 8	8. 976*n*	0. 722	+1. 12	− 7. 7
Apr. 11	9 45 4	11 14 26. 08	+ 3 10 23. 6	−2 31. 78	− 5 52. 6	t20, 4	8. 309*n*	0. 708	+1. 00	− 7. 8
16	10 8 52	11 6 31. 50	+ 3 28 50. 6	+3 46. 00	− 0 12. 9	t25, 5	8. 914	0. 706	+0. 94	− 8. 1
23	9 15 51	10 56 22. 46	+ 3 50 35. 8	+3 24. 20	− 0 21. 0	t25, 5	8. 713	0. 702	+0. 82	− 7. 8
May 9	9 32 11	10 37 15. 01	+ 4 22 14. 3	−3 26. 26	− 3 20. 3	t15, 3	9. 375	0. 702	+0. 57	− 7. 0
18	9 16 39	10 29 7. 84	+ 4 28 49. 3	−1 17. 83	− 1 1. 5	t25, 5	9. 452	0. 704	+0. 41	− 6. 6
June 16	9 33 23	10 14 8. 45	+ 4 2 52. 5	−2 29. 26	+ 2 55. 6	t25, 5	9. 645	0. 729	+0. 01	− 5. 1
REID (1925 b)										
1925										
Mar. 28	11 22 14	13 25 52. 81	−21 22 46. 9	+0 1. 14	− 1 56. 0	d10, 8	9. 314*n*	0. 868	+1. 35	− 3. 4
Apr. 13	12 6 23	13 6 12. 47	−25 33 1. 3	−2 37. 06	+ 5 50. 5	t25, 5	8. 785	0. 897	+1. 57	− 6. 3
16	11 16 41	13 1 52. 63	−26 18 23. 1	+1 32. 75	− 1 16. 6	t25, 5	8. 129*n*	0. 901	+1. 60	− 7. 3
23	10 52 7	12 51 12. 13	−28 1 51. 5	−3 55. 21	− 2 28. 3	t25, 5	8. 234	0. 907	+1. 61	− 8. 4
May 19	9 29 31	12 16 3. 55	−33 30 26. 5	−2 53. 12	+ 4 31. 3	t25, 5	9. 168	0. 915	+1. 42	−14. 0
ORKISZ (1925 c)										
1925										
Apr. 6	16 40 9	22 29 0. 80	+19 1 17. 7	+4 28. 12	− 2 22. 6	t25, 5	9. 663*n*	0. 654	−0. 91	− 9. 5
11	16 3 46	22 34 20. 67	+24 31 45. 6	−0 57. 94	+ 5 40. 8	t25, 5	9. 691*n*	0. 642	−0. 85	−10. 5
20	16 13 27	22 45 57. 53	+35 29 57. 1	−3 41. 31	+ 1 51. 7	t25, 5	9. 720*n*	0. 486	−0. 71	−12. 3
May 2	14 30 32	23 8 23. 90	+51 32 27. 5	+0 50. 58	+ 1 24. 2	t30, 10	9. 866*n*	0. 519	−0. 53	−14. 6
22	13 38 47	1 4 38. 24	+77 4 57. 4	+2 13. 43	+ 2 39. 8	t25, 5	0. 280*n*	0. 560	−1. 88	−15. 2
June 20	12 12 34	9 29 26. 63	+69 59 4. 6	−0 40. 19	+ 0 33. 0	t30, 10	0. 012	0. 778	−2. 26	+ 8. 6
July 18	9 24 40	10 31 36. 79	+54 40 46. 5	−4 41. 76	− 1 17. 7	t25, 5	9. 892	0. 614n	−1. 09	+ 6. 4

FINSLER (1924 c)

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
14 23 27. 98	+ 5 36 47. 0	Ast Tou +5°1420, 46	5	26	183	B.	
14 26 48. 44	+ 4 14 48. 7	Ast Tou +5°1428, 76	3	26	183	B.	6½^{m}.
14 57 11. 85	− 3 47 49. 3	Ast Fer −3°1452, 157; −3°1500, 4; −4°1456, 63.	3	26	183	B.	Hurried.
15 0 15. 79	− 4 39 30. 7	Ast Fer −4°1456, 98; −5°1500, 68	3	26	183	B.	Bothered by wires 10 rev. apart, causing bad settings.
15 3 36. 98	− 5 23 54. 6	Ast Fer −5°1500, 161; −6°1504, 31	3	26	183	B.	
15 17 47. 16	− 9 22 12. 1	AG Wien-Ottakring 5366	4	26	183	B.	8½^{m}. Twilight. Wires 10 rev. apart interfere greatly in both α and δ.
15 20 58. 28	−10 3 44. 6	AG Wien-Ottakring 5385	4	26	183	B.	Twilight. Ft.
15 23 21. 92	−10 41 49. 7	AG Harvard 5398	5	26	183	B.	Ft. Twilight. Thick haze. Used brtr. comp. of star.
15 25 15. 35	−11 28 7. 9	AG Harvard 5407	4	26	183	B.	Twilight. Ft. at last.
15 29 17. 44	−12 32 23. 3	AG Harvard 5429	3	26	183	B.	Ft. Twilight. Stopped by clds.

SCHAIN-COMAS SOLÀ (1925 a)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
11 43 18. 52	+ 1 55 40. 5	AG Albany 4351	2	26	183	B.	Clds.
11 16 56. 86	+ 3 16 24. 0	AG Alb 4251; Abbadia (+4° à−2°) 6895	3	26	183	Bn.	Haze. Ft. Too much haze to finish.
11 2 44. 56	+ 3 29 11. 6	Abbadia (+4° à−2°) 6808	3	26	183	Bn.	Barely visible in 5-inch finder.
10 52 57. 45	+ 3 51 4. 5	AG Alb 4171; Abbadia (+4° à−2°) 6750	3	26	183	Bn.	Ft.
10 40 40. 70	+ 4 25 41. 6	Abbadia (+4° à−2°) 6653	4	26	183	Bn.	V. ft. Moonlight and haze.
10 30 25. 26	+ 4 29 57. 4	AG Alb 4072; Abbadia (+4° à−2°) 6588	3	26	183	Bn.	Stopped by haze.
10 16 37. 70	+ 4 0 2. 0	Abbadia (+4° à−2°) 6488	5	26	183	Bn.	V. ft.

REID (1925 b)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
13 25 50. 32	−21 20 47. 5	Ast Hyd−21°1324, 57679; c. w. −21°1324, 57681; c. w. AG Alg 5734.	4	26	183	B.	Thick haze.
13 8 47. 96	−25 38 45. 5	Córdoba A 9789	4	26	183	Bn.	Barely visible in 5-inch finder.
13 0 18. 28	−26 16 59. 2	Córdoba A 9729	3	26	183	Bn.	9^{m}. Easily seen in 5-inch.
12 55 5. 73	−27 59 14. 8	Córdoba B 8301	4	26	183	Bn.	9^{m}. Easily seen in 5-inch.
12 18 55. 25	−33 34 43. 8	Córdoba C 6336	3	26	183	Bn.	Visible in 5-inch finder.

ORKISZ (1925 c)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
22 24 33. 59	+19 3 49. 8	AG Berl A 9188; Abbadia (+16° à+24°) 13288.	3	26	183	Bn.	9^{m}.
22 35 19. 46	+24 26 15. 3	AG Berl B 8698; Abbadia (+16° à+24°) 13378.	4	26	183	Bn.	Thin clds.
22 49 39. 55	+35 28 17. 7	AG Lund 10934	3	26	183	Bn.	Visible in 2-inch. Trace of tail toward west.
23 7 33. 85	+51 31 17. 9	AG Harvard 8115	3	26	183	Bn.	9^{m}.
1 2 26. 69	+77 2 32. 8	Gr Ast Vol. III 6460	4	26	183	Bn.	Visible in 5-inch finder.
9 30 9. 08	+69 58 23. 0	Gr Ast Vol. III 11306	4	26	367	Bn.	Visible in 5-inch.
10 36 19. 64	+54 41 57. 8	AG Harvard 3687	2	26	183	Bn.	Barely visible in 5-inch. Star has ft. comp. s. f.

TEMPEL II (1925 d). See 1920 b

BORRELLY (1925 f). See 1918 c

VAN BIESBROECK (1925 j)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1925	h m s	h m s	° ′ ″	m s	′ ″				s	″
Nov. 17	16 6 31	11 57 19. 83	+34 36 2. 2	+1 12. 41	+ 9 14. 3	t25, 5	9. 686n	0. 419	+0. 64	−16. 9
20	15 26 3	11 59 40. 60	+33 35 26. 9	+4 13. 52	+ 0 39. 2	t25, 5	9. 708n	0. 504	+0. 78	−17. 6
28	15 36 37	12 4 30. 26	+30 59 40. 1	−1 46. 92	+11 10. 4	t25, 5	9. 661n	0. 464	+0. 97	−18. 3
1926										
Jan. 16	15 6 42	11 40 0. 76	+18 3 6. 6	+3 4. 37	− 4 13. 4	t25, 5	9. 012n	0. 499	−0. 14	− 4. 4
Feb. 4	11 57 14	11 4 55. 87	+13 36 7. 7	+1 40. 44	+ 2 46. 1	t25, 5	9. 401n	0. 600	+0. 46	− 5. 2
15	11 51 8	10 41 52. 29	+11 4 56. 6	+4 4. 13	− 2 32. 5	t25, 5	9. 140n	0. 617	+0. 70	− 5. 7
Apr. 2	10 56 17	9 38 56. 88	+ 3 3 27. 3	−0 40. 50	+ 5 35. 2	t25, 5	9. 360	0. 714	+0. 56	− 7. 5
15	8 35 18	9 34 44. 60	+ 1 31 38. 5	+3 38. 27	− 0 0. 6	t25, 5	8. 834	0. 726	+0. 38	− 7. 8
May 7	9 11 0	9 37 10. 48	− 0 48 9. 9	+1 5. 70	+ 0 19. 6	t25, 5	9. 455	0. 746	+0. 11	− 7. 6

PELTIER-WILK (1925 k)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1925										
Nov. 21	7 56 28	17 51 18. 77	+27 15 56. 7	+1 45. 90	+ 3 6. 6	t25, 5	9. 711	0. 680	−0. 01	+11. 8
24	7 13 8	18 24 34. 34	+20 3 26. 3	−2 53. 66	− 1 56. 1	t25, 5	9. 673	0. 661	+0. 29	+13. 2
Dec. 7	7 44 47	19 37 50. 66	− 1 21 1. 0	+4 8. 26	− 8 59. 9	t25, 5	9. 650	0. 743	+0. 82	+11. 0
10	7 39 45	19 46 8. 77	− 4 22 50. 0	+3 10. 67	− 0 3. 4	t15, 3	9. 651	0. 748	+0. 85	+10. 3

BLATHWAYT (1926 b)

Date	W. M. T.	Apparent Place of Comet α	Apparent Place of Comet δ	Comet—Star α	Comet—Star δ	Comp.	Log pρ α	Log pρ δ	Star to App. Place α	Star to App. Place δ
1926										
Feb. 16	11 3 18	7 19 39. 63	+33 28 38. 7	+1 29. 06	+ 0 1. 0	t25, 5	9. 318	0. 036	+0. 56	− 1. 6

NOTE.—Mar. 9.9. Comet too faint and diffuse to measure. Perhaps 14^m.

TEMPEL II (1925 d). See 1920 b

BORRELLY (1925 f). See 1918 c

VAN BIESBROECK (1925 j)

Mean Place of Star for Beginning of Year α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
h m s	° ′ ″			in.			
11 56 6.78	+34 27 4.8	AG Leiden 4561	3	26	183	Bn.	9m. Vis. in 5-inch. Nucleus well defined. Est. pos. angle of tail=320°.
11 55 26.30	+33 35 5.3	AG Leiden 4559	3	26	183	Bn.	Star has ft. comp. n. f. nearly 0° in pos. angle.
12 6 16.21	+30 48 48.0	Gr (+24° to +32°) 5653	3	26	183	Bn.	
11 36 56.53	+18 7 24.4	Abbadia (+16° à+24°) 6469	3	26	183	Bn.	Visible in 5-inch.
11 3 14.97	+13 33 26.8	AG Leipzig I 4198	4	26	183	Bn.	Barely vis. in 5-inch. Windy.
10 37 47.46	+11 7 34.8	Bordeaux (+11°) 384	4	26	183	Bn.	Visible in 5-inch.
9 39 36.82	+ 2 57 59.6	Abbadia (+4° à−2°) 6215	3	26	183	Bn.	Barely vis. in 5-inch. Haze. Star has comp.
9 31 5.95	+ 1 31 46.9	Abbadia (+4° à−2°) 6155	3	26	183	Bn.	Barely vis. in 5-inch. Ft. nucleus.
9 36 4.66	− 0 48 21.9	1st Gr Cat for 1925.0, 1043	3	26	183	Bn.	V. faint. Haze.

PELTIER-WILK (1925 k)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
17 49 32.88	+27 12 38.3	AG Cambridge 8498	4	12	115	Bn.	9m. No well-defined nucleus.
18 27 27.71	+20 5 9.2	Abbadia (+16° à+24°) 9858	3	12	115	Bn.	9m. Easily visible in 4-inch finder.
19 33 41.58	− 1 12 12.1	Abbadia (+4° à−2°) 10898	5	12	115	Bn.	Diffuse.
19 42 57.25	− 4 22 56.9	Abbadia (−3° à−9°) 6125	4	12	115	Bn.	8½m. Too near horizon to finish.

BLATHWAYT (1926 b)

α	δ	Authority	Seeing	Inst.	Power	Obsr.	Remarks
7 18 10.01	+33 28 39.3	AG Leiden 3105	2	26	183	Bn.	Barely visible in 5-inch. Very ft. nucleus.

OBSERVATIONS OF OCCULTATIONS

Throughout Part I of this volume the astronomical dates
are used as employed before 1925

Date	Object	Ph.	26-inch W. Sid. T.	26-inch W. M. T.	26-inch Seeing	26-inch Power	26-inch Obsr.	26-inch Rem.	12-inch W. Sid. T.	12-inch W. M. T.	12-inch Seeing	12-inch Power	12-inch Obsr.	12-inch Rem.
1908			h m s	h m s					h m s	h m s				
Jan. 18	η Cancri	DB	4 49 20.5	9 0 59.9	4	252	Hd.	u 20.	4 49 16.7	9 0 56.1	4	115	Fn.	uf.
18	η Cancri	RD	6 10 22.2	10 21 48.4	4	252	Hd.		-- -- ----	-- -- ----	-	---		
18	39 Cancri	DB	-- -- ----	-- -- ----	-	---			10 9 20.8	14 20 7.8	4	115	Fn.	f.
18	39 Cancri	RD	-- -- ----	-- -- ----	-	---			11 32 38.8	15 43 12.2	4	115	Fn.	
18	40 Cancri	DB	-- -- ----	-- -- ----	-	---			10 14 49.5	14 25 35.6	4	115	Fn.	f.
18	40 Cancri	RD	-- -- ----	-- -- ----	-	---			11 37 25.7	15 47 58.3	4	115	Fn.	
29	B. A. C. 6088	RD	-- -- ----	-- -- ----	-	---			15 7 37.3	18 34 20.4	-	115	Fn.	
Mar. 7	Mayer 121	DD	-- -- ----	-- -- ----	-	---			5 11 14.3	6 10 10.6	3	115	Fn.	
7	Mayer 121	RB	6 24 46.8	7 23 31.0	4	252	Hd.	1 5.	-- -- ----	-- -- ----	-	---		
10	η Geminorum	DD	5 38 44.4	6 25 48.5	4	252	Hd.		5 38 44.6	6 25 48.7	3	160	Fn.	
10	η Geminorum	RB	6 28 22.2	7 15 18.1	4	252	Hd.		6 28 23.2	7 15 19.1	3	335	Fn.	
Apr. 6	141 Tauri	DD	10 53 47.4	9 53 50.4	3	252	Hd.		10 53 47.5	9 53 50.5	3	235	Fn.	
6	141 Tauri	RB	11 26 24.2	10 26 21.8	3	252	Hd.	sl.	11 26 27.0	10 26 24.6	4	235	Fn.	
9	39 Cancri	DD	12 46 8.1	11 34 5.0	3	252	Hd.		12 46 8.1	11 34 5.0	4	115	Fn.	
9	39 Cancri	RB	13 30 39.5	12 18 29.0	3	252	Hd.	1 f.	-- -- ----	-- -- ----	-	---		
9	40 Cancri	DD	12 55 27.5	11 43 22.8	3	252	Hd.		12 55 27.6	11 43 22.9	4	115	Fn.	
9	40 Cancri	RB	13 30 0.1	12 17 49.8	3	252	Hd.	1.	-- -- ----	-- -- ----	-	---		
13	ν Virginis	DD	8 14 2.2	6 47 0.0	4	252	Hd.		8 14 2.2	6 47 0.0	3	115	Fn.	
13	ν Virginis	RB	9 32 11.3	8 4 56.3	4	252	Hd.		-- -- ----	-- -- ----	-	---		
June 11	o^1 Libræ	DD	19 6 0.2	13 45 12.5	4	388	Hd.		19 6 0.2	13 45 12.5	3	---	Fn.	
14	Bradley 2276	DB	14 43 17.6	9 11 25.2	4	388	Hd.	su.	-- -- ----	-- -- ----	-	---		
14	Bradley 2276	RB	15 43 44.2	10 11 41.9	4	388	Hd.		-- -- ----	-- -- ----	-	---		
15	χ^3 Sagittarii	RD	20 50 16.1	15 13 27.6	4	252	Hd.		20 50 16.4	15 13 28.0	3	160	Fn.	
16	Piazzi XX 146	DB	19 31 19.3	13 50 47.9	3	252	Hd.	sh.	-- -- ----	-- -- ----	-	---		
16	Piazzi XX 146	RD	20 48 22.0	15 7 38.0	3	252	Hd.		-- -- ----	-- -- ----	-	---		
July 17	30 Piscium	DB	22 6 15.7	14 23 25.7	-	252	Hl.		22 6 16.3	14 23 26.2	3	335	Fn.	
17	30 Piscium	RD	22 19 48.8	14 36 56.5	-	252	Hl.	1 2.	22 19 48.9	14 36 56.7	3	335	Fn.	
Aug. 3	η Virginis	DD	-- -- ----	-- -- ----	-	---			18 48 49.5	9 59 41.3	2	160	Fn.	
9	χ^3 Sagittarii	DD	20 3 7.9	10 50 12.1	-	375	Hl.		20 3 8.1	10 50 12.3	2	335	Fn.	
9	χ^3 Sagittarii	RB	21 8 17.6	11 55 11.2	-	375	Hl.		-- -- ----	-- -- ----	-	---		
10	Piazzi XX 146	DD	19 13 18.2	9 56 34.7	-	375	Hl.		19 13 18.2	9 56 34.7	-	---	P.	
10	Piazzi XX 146	RB	20 27 40.1	11 10 44.4	-	375	Hl.		20 27 39.3	11 10 43.6	-	---	P.	
Sept. 6	B. A. C. 6814	DD	17 38 14.8	6 35 37.3	3	252	Hd.		17 38 14.8	6 35 37.3	4	115	Fn.	
6	B. A. C. 6814	RB	18 27 8.1	7 24 22.6	3	360	Hd.	1.	-- -- ----	-- -- ----	-	---		
10	33 Piscium	DB	22 22 1.7	11 2 54.1	3	360	Hd.	sc.	-- -- ----	-- -- ----	-	---		
10	33 Piscium	RD	23 36 13.6	12 16 53.8	3	360	Hd.	su vh.	-- -- ----	-- -- ----	-	---		
Oct. 14	3 Geminorum	DB	-- -- ----	-- -- ----	-	---			2 47 44.2	13 14 12.2	2	160	Fn.	
14	3 Geminorum	RD	3 40 35.4	14 6 54.7	-	360	Hl.	1 5.	3 40 35.0	14 6 54.4	2	160	Fn.	
Dec. 3	ν Piscium	DD	-- -- ----	-- -- ----	-	---			4 24 50.3	11 34 26.9	2	115	Ep.	
3	ν Piscium	RB	-- -- ----	-- -- ----	-	---			5 0 18.6	12 9 49.4	4	115	Ep.	1 h.
7	n Tauri	DB	3 53 59.2	10 47 57.3	5	525	Fn.		3 52 54.8	10 46 53.0	5	160	Ep.	
7	n Tauri	RD	5 9 30.1	12 3 15.8	5	525	Fn.		5 9 32.2	12 3 17.9	5	160	Ep.	
8	3 Geminorum	DB	0 48 46.3	7 39 18.7	4	252	Fn.		0 48 51.5	7 39 23.9	5	115	Ep.	
8	3 Geminorum	RD	1 1 54.6	7 52 24.9	4	252	Fn.		-- -- ----	-- -- ----	-	---		
8	9 Geminorum	DB	4 20 55.2	11 10 52.9	-	360	Fn.		-- -- ----	-- -- ----	-	---		
8	9 Geminorum	RD	5 46 56.2	12 36 39.8	-	360	Fn.		5 46 56.1	12 36 39.7	2	115	Ep.	
8	8 Geminorum	DB	4 34 9.6	11 24 5.1	-	360	Fn.		-- -- ----	-- -- ----	-	---		
8	8 Geminorum	RD	4 56 12.5	11 46 4.4	-	360	Fn.		-- -- ----	-- -- ----	-	---		
9	48 Geminorum	DB	4 22 1.3	11 8 3.0	4	360	Fn.		4 22 1.4	11 8 3.1	5	160	Ep.	
9	48 Geminorum	RD	4 41 39.2	11 27 37.6	4	360	Fn.		4 41 39.4	11 27 37.8	5	160	Ep.	
1909														
Jan. 2	163 B. Tauri	DD	3 17 55.8	8 29 46.1	3	360	Fn.		-- -- ----	-- -- ----	-	---		
2	163 B. Tauri	RB	4 0 52.0	9 12 35.2	5	360	Fn.		-- -- ----	-- -- ----	-	---		
27	39 B. Arietis	RB	-- -- ----	-- -- ----	-	---			7 4 6.4	10 37 1.8	5	115	Ep.	1 10 to 20.
Feb. 28	8 Geminorum	DD	-- -- ----	-- -- ----	-	---			5 29 21.6	6 56 43.4	2	196	Ep.	
Mar. 14	63 Ophiuchi	DB	-- -- ----	-- -- ----	-	---			15 28 19.7	15 59 0.7	4	160	Ep.	
14	63 Ophiuchi	RD	16 47 23.8	17 17 51.8	3	173	Fn.		16 47 23.6	17 17 51.6	1	160	Ep.	
28	ω Geminorum	DD	11 24 18.3	11 0 36.6	-	252	Fn.		11 24 18.4	11 0 36.7	2	115	Ep.	
28	ω Geminorum	RB	12 27 57.1	12 4 5.0	-	375	Fn.		12 27 56.7	12 4 4.6	2	115	Ep.	
30	γ Cancri	DD	8 8 14.5	7 37 13.1	3	525	Fn.		8 8 14.3	7 37 12.9	2	115	Ep.	
30	γ Cancri	RB	8 28 56.7	7 57 51.9	3	525	Fn.		8 28 55.5	7 57 50.7	2	115	Ep.	
Apr. 24	52 B. Geminorum	DD	10 32 8.7	8 22 26.0	-	252	Fn.		10 32 8.8	8 22 26.1	2.	335	Ep.	
24	52 B. Geminorum	RB	-- -- ----	-- -- ----	-	---			11 35 25.5	9 25 32.4	2	335	Ep.	
24	B. D.+24° 1343	DD	-- -- ----	-- -- ----	-	---			11 34 52.8	9 24 59.8	-	34	Ep.	A.
May 4	6 B. Libræ	DB	10 21 33.1	7 32 33.1	5	252	Fn.		10 21 31.1	7 32 31.1	5	160	Ep.	
31	4 G. Libræ	DD	15 10 9.2	10 34 12.3	3	252	Fn.	h.	-- -- ----	-- -- ----	-	---		
June 20	γ Cancri	DD	14 49 42.8	8 55 11.0	-	---	Fn.		-- -- ----	-- -- ----	-	---		
July 10	64 Ceti	DB	21 13 40.8	13 59 27.8	3	252	Fn.		-- -- ----	-- -- ----	-	---		
10	64 Ceti	RD	22 15 15.5	15 0 52.5	3	360	Fn.		22 15 15.8	15 0 52.7	2	235	Ep.	
10	ξ^1 Ceti	DB	22 9 56.6	14 55 34.4	2	360	Fn.		22 9 56.7	14 55 34.5	2	235	Ep.	
10	ξ^1 Ceti	RD	23 15 21.4	16 0 48.5	2	252	Fn.		23 15 21.7	16 0 48.8	2	235	Ep.	
27	84 B. Scorpii	DD	18 16 56.6	9 56 22.1	-	252	Fn.		18 16 56.6	9 56 22.1	2	235	Ep.	
27	84 B. Scorpii	RB	19 36 24.3	11 15 36.8	-	252	Fn.		-- -- ----	-- -- ----	-	---		
27	51 G. Scorpii	DD	19 54 25.2	11 33 34.8	-	252	Fn.		19 54 25.3	11 33 34.9	4	235	Ep.	
Aug. 4	33 Piscium	DB	-- -- ----	-- -- ----	-	---			19 12 42.2	10 20 31.3	3	115	Fn.	
4	33 Piscium	RD	-- -- ----	-- -- ----	-	---			20 12 38.6	11 20 17.8	3	115	Fn.	
29	154 B. Capricorni	DD	-- -- ----	-- -- ----	-	---			23 37 14.2	13 6 2.3	3	335	Fn.	
30	69 Aquarii	DB	-- -- ----	-- -- ----	-	---			21 42 4.2	11 7 15.2	3	115	Ep.	
30	69 Aquarii	RB	-- -- ----	-- -- ----	-	---			22 45 47.7	12 10 48.2	3	115	Ep.	
30	τ Aquarii	DB	-- -- ----	-- -- ----	-	---			23 1 27.3	12 26 25.3	2	115	Ep.	

A. Observed with 4-inch finder.

Date	Object	Ph.	26-inch W. Sid. T.	26-inch W. M. T.	26-inch Seeing	26-inch Power	26-inch Obsr.	26-inch Rem.	12-inch W. Sid. T.	12-inch W. M. T.	12-inch Seeing	12-inch Power	12-inch Obsr.	12-inch Rem.
1909			h m s	h m s					h m s	h m s				
Aug. 30	τ Aquarii	RB	-- -- ----	-- -- ----	-	---			0 15 7.5	13 39 53.4	2	115	Ep.	
Sept. 1	Mars I	DB	19 24 13.7	8 41 55.5	3	178	Ep.		19 24 13.2	8 41 55.0	4	235	Fn.	
1	Mars II	DB	19 24 45.7	8 42 27.4	3	178	Ep.		19 24 48.7	8 42 30.4	4	235	Fn.	
1	Mars III	RD	20 21 33.1	9 39 5.5	3	178	Ep.		20 21 33.8	9 39 6.2	4	235	Fn.	l.
1	Mars IV	RD	20 22 15.1	9 39 47.4	3	178	Ep.		20 22 15.2	9 39 47.5	4	235	Fn.	
25	33 Capricorni	DD	-- -- ----	-- -- ----	-	---			1 9 59.1	12 52 22.4	3	115	Fn.	
28	33 Piscium	DD	-- -- ----	-- -- ----	-	---			18 39 35.6	6 11 15.2	4	115	Fn.	
28	33 Piscium	RB	-- -- ----	-- -- ----	-	---			19 37 51.3	7 9 21.4	4	115	Fn.	
28	24 B. Ceti	DD	-- -- ----	-- -- ----	-	---			21 16 23.2	8 47 37.1	5	160	Fn.	su f.
29	26 Ceti	RD	-- -- ----	-- -- ----	-	---			21 13 39.3	8 40 57.7	-	115	Fn.	
29	33 Ceti	DB	-- -- ----	-- -- ----	-	---			0 7 39.2	11 34 29.1	4	335	Fn.	
29	33 Ceti	RD	-- -- ----	-- -- ----	-	---			1 20 51.8	12 47 29.7	4	335	Fn.	
Nov. 19	37 Capricorni	DD	-- -- ----	-- -- ----	-	---			0 29 21.5	8 35 36.5	2	115	Ep.	
19	37 Capricorni	RB	-- -- ----	-- -- ----	-	---			1 28 2.8	9 34 8.2	4	115	Ep.	h l 10.
26	B. D.+20° 710	DE	6 35 29.0	14 13 12.6	2	178	Ep.	A.	-- -- ----	-- -- ----	-	---		
26	B. D.+20° 710	RE	7 23 8.7	15 0 44.5	2	178	Ep.		-- -- ----	-- -- ----	-	---		
26	*b* 10^m	DE	7 0 8.7	14 37 48.3	2	178	Ep.		-- -- ----	-- -- ----	-	---		
26	*b* 10^m	RE	-- -- ----	-- -- ----	-	---			8 10 52.7	15 48 20.7	-	115	H.	
26	B. D.+20° 713	DE	7 10 54.2	14 48 32.0	2	178	Ep.		7 10 54.6	14 48 32.4	-	115	H.	
26	B. D.+20° 713	RE	8 18 35.8	15 56 2.5	2	178	Ep.		8 18 38.1	15 56 4.8	-	115	H.	l 20.
26	B. D.+20° 715	DE	7 34 44.8	15 12 18.7	2	178	Ep.		7 34 44.8	15 12 18.7	-	115	H.	
26	B. D.+20° 715	RE	-- -- ----	-- -- ----	-	---			8 14 13.9	15 51 41.4	-	115	H.	B.
26	B D.+20° 716	DE	7 46 40.8	15 24 12.8	2	178	Ep.		7 46 40.8	15 24 12.8	-	115	H.	
26	B. D.+20° 716	RE	-- -- ----	-- -- ----	-	---			8 39 4.8	16 16 28.2	-	115	H.	
26	*c* 10^m	DE	8 0 25.3	15 37 55.0	2	178	Ep.	C.	-- -- ----	-- -- ----	-	---		
26	*c* 10^m	RE	8 59 34.3	16 36 54.3	2	178	Ep.		-- -- ----	-- -- ----	-	---		
26	*e* 10^m	DE	8 27 21.0	16 4 46.4	2	178	Ep.		-- -- ----	-- -- ----	-	---		
26	*g* 11^m	DE	8 12 29.2	15 49 56.9	2	178	Ep.		-- -- ----	-- -- ----	-	---		
26	*d* 10^m	RE	9 3 52.8	16 41 12.1	2	178	Ep.		-- -- ----	-- -- ----	-	---		
26	*f* 10^m	DE	8 36 15.1	16 13 39.0	2	178	Ep.		8 36 12.4	16 13 36.3	-	115	H.	
26	*f* 10^m	RE	9 9 21.4	16 46 39.8	2	178	Ep.	l.	-- -- ----	-- -- ----	-	---		
26	B. D.+20° 719	DE	8 50 26.4	16 27 47.9	2	178	Ep.		8 50 23.3	16 27 44.8	-	115	H.	
26	B. D.+20° 721	DE	9 2 41.3	16 40 0.8	2	178	Ep.		9 2 43.6	16 40 3.1	-	115	H.	
26	B. D.+20° 718	RE	9 37 21.3	17 14 35.1	2	178	Ep.	p.	-- -- ----	-- -- ----	-	---		
Dec. 22	31 Arietis	DD	-- -- ----	-- -- ----	-	---			1 22 10.8	7 18 32.1	3	115	Ep.	
22	31 Arietis	RB	-- -- ----	-- -- ----	-	---			2 8 16.5	8 4 30.2	3	115	Ep.	
1910														
May 19	46 Virginis	DD	14 19 54.3	10 32 13.5	2	388	Bn.	c.	-- -- ----	-- -- ----	-	---		
19	46 Virginis	RB	15 24 28.2	11 36 36.9	4	388	Bn.	l 30 cp.	-- -- ----	-- -- ----	-	---		
July 24	τ Aquarii	RD	21 20 35.5	13 12 15.7	-	---	Bn.		-- -- ----	-- -- ----	-	---		
Aug. 27	99 Tauri	DB	1 30 28.9	15 7 47.2	-	388	Hl.		-- -- ----	-- -- ----	-	---		
27	99 Tauri	RD	2 22 15.2	15 59 25.0	-	388	Hl.		-- -- ----	-- -- ----	-	---		
Oct. 15	336 B. Aquarii	DD	-- -- ----	-- -- ----	-	---			0 1 57.5	10 26 50.8	2	160	Bn.	
24	28 Cancri	DB	3 33 39.3	13 22 34.8	3	388	Hl.		-- -- ----	-- -- ----	-	---		
24	28 Cancri	RD	4 27 46.2	14 16 32.8	3	388	Hl.		-- -- ----	-- -- ----	-	---		
24	υ^1 Cancri	DB	5 1 16.1	14 49 57.2	3	388	Hl.		5 1 15.7	14 49 56.8	4	160	Bn.	h p.
24	υ^1 Cancri	RD	5 58 15.1	15 46 46.9	3	388	Hl.		5 58 15.5	15 46 47.3	4	160	Bn.	h p.
24	υ^2 Cancri	DB	6 1 5.6	15 49 36.9	3	388	Hl.		6 1 4.9	15 49 36.2	4	160	Bn.	
24	υ^2 Cancri	RD	6 34 17.1	16 22 42.9	3	388	Hl.		6 34 17.1	16 22 43.0	3	160	Bn.	
Nov. 7	248 B. Sagittarii	DD	-- -- ----	-- -- ----	-	---			22 6 34.9	7 1 21.2	2	115	Ep.	
17	284 B. Tauri	DB	-- -- ----	-- -- ----	-	---			22 34 50.4	6 50 12.9	4	115	Ep.	sc.
17	315 B. Tauri	DB	-- -- ----	-- -- ----	-	---			7 55 33.4	16 9 24.1	2	85	Ep.	
17	315 B. Tauri	RD	-- -- ----	-- -- ----	-	---			9 1 3.9	17 14 43.8	2	85	Ep.	
20	4 Cancri	DB	-- -- ----	-- -- ----	-	---			2 4 13.7	10 7 14.2	3	115	Ep.	
20	4 Cancri	RD	-- -- ----	-- -- ----	-	---			3 3 22.1	11 6 13.0	2	115	Ep.	
22	η Leonis	DB	-- -- ----	-- -- ----	-	---			8 57 2.7	16 51 3.7	2	235	Bn.	
22	η Leonis	RD	-- -- ----	-- -- ----	-	---			10 16 39.3	18 10 27.4	2	235	Bn.	
22	η Leonis	DB	-- -- ----	-- -- ----	-	---			8 56 59	16 51 0	2	34	Ep.	i D.
22	η Leonis	RD	-- -- ----	-- -- ----	-	---			10 16 39	18 10 27	2	34	Ep.	i D.
Dec. 14	192 B. Tauri	DD	4 23 55.6	10 52 11.4	3	388	Hl.		-- -- ----	-- -- ----	-	---		
14	192 B. Tauri	RB	5 36 4.3	12 4 8.2	3	388	Hl.		-- -- ----	-- -- ----	-	---		
14	υ Tauri	DD	-- -- ----	-- -- ----	-	---			10 35 15.8	17 2 30.7	3	115	Ep.	
14	72 Tauri	DD	-- -- ----	-- -- ----	-	---			10 55 57.1	17 23 8.6	4	115	Ep.	
17	*c* Geminorum	DB	9 29 15.6	15 44 53.6	3	388	Hl.		9 29 15.1	15 44 53.1	3	235	Ep.	e 2.
17	*c* Geminorum	RD	10 33 12.7	16 48 40.2	3	388	Hl.	sc.	10 33 12.6	16 48 40.1	3	235	Ep.	sc.
20	46 Leonis	DB	6 21 55.8	12 26 16.8	4	388	Hl.	e 3 w.	6 22 3.8	12 26 24.7	5	115	Ep.	
20	46 Leonis	RD	6 51 42.5	12 55 58.5	4	388	Hl.		6 51 42.6	12 55 58.6	3	115	Ep.	
1911														
Jan. 5	ψ^3 Aquarii	DD	1 4 41.9	6 7 0.2	3	388	Hl.	i.	1 4 41.4	6 6 59.7	2	115	Ep.	
5	ψ^3 Aquarii	RB	2 2 58	7 5 7	3	252	Hl.	l 5 i sc.	2 2 59.5	7 5 8.3	2	115	Ep.	l 2 h.
5	B. D.−10° 6095	DD	-- -- ----	-- -- ----	-	---			1 10 27.7	6 12 45.1	2	115	Ep.	
9	o Arietis	DD	4 1 2.8	8 47 8.5	4	388	Bn.	w.	4 1 2.8	8 47 8.5	3	115	Ep.	
9	o Arietis	RB	5 9 59.5	9 55 53.9	4	178	Bn.		5 10 1.6	9 55 56.0	4	115	Ep.	
14	4 Cancri	DB	3 10 52.6	7 37 27.0	4	178	Bn.	h.	3 10 52.8	7 37 27.2	5	235	Ep.	
15	90 H^1. Cancri	DB	8 31 53.7	12 53 39.6	3	178	Hl.	w.	8 31 54.6	12 53 40.5	3	115	Bn.	

A. Positions of stars on this date for 1910.0: *b*, $4^h\ 6^m\ 17^s.8$, +20° 19′.5; *c*, $4^h\ 8^m\ 16^s.1$, +20° 21′.4; *d*, $4^h\ 8^m\ 21^s.2$, +20°24′.1; *e*, $4^h\ 9^m\ 17^s.6$, +20° 18′.8; *f*, $4^h\ 8^m\ 54^s.9$, +20° 38′.5; *g*, $4^h\ 8^m\ 34^s.8$, +20°23′.4. $\Delta\alpha$ and $\Delta\delta$ of these stars were observed on the 12-inch by Ep. (See under Miscellaneous Stars, p. 242.) B. 4^m earlier than predicted. C. Chronograph record doubtful. D. Observed with 4-inch finder.

Date	Object	Pb.	26-inch						12-inch					
			W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.	W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.
1911			h m s	h m s					h m s	h m s				
Jan. 16	η Leonis	DB	6 36 46.6	10 54 55.5	2	178	Bn.	rh	6 36 46.6	10 54 55.4	1	335	Ep.	
16	η Leonis	RD	-- -- ----	-- -- ----	-	---			7 45 42.3	12 3 39.8	1	115	Ep.	l 1.
Feb. 10	c Geminorum	DD	9 42 15.5	12 21 36.2	2	178	Bn.		9 42 15.8	12 21 36.5	1	500	Ep.	
10	c Geminorum	RB	10 45 12.8	13 24 23.2	2	178	Bn.		10 45 14.1	13 24 24.5	1	500	Ep.	l 10.
13	46 Leonis	DB	5 42 33.0	8 10 45.2	4	178	Bn.	h.	5 42 26.4	8 10 38.6	4	160	Ep.	
13	46 Leonis	RD	6 48 13.8	9 16 15.2	2	178	Bn.		6 48 13.9	9 16 15.3	2	160	Ep.	
Apr. 15	147 B. Libræ	DB	-- -- ----	-- -- ----	-	---			11 26 38.3	9 54 3.8	5	115	Ep.	vu.
15	147 B. Libræ	RD	12 30 47.8	10 58 2.7	4	183	Bn.	h.	-- -- ----	-- -- ----	-	---		
May 15	10 G. Sagittarii	RD	-- -- ----	-- -- ----	-	---			19 51 22.5	16 19 28.0	2	115	Bn.	A.
19	35 Capricorni	DB	18 20 22.1	14 32 58.9	3	367	Ep.		-- -- ----	-- -- ----	--	---		
19	35 Capricorni	RD	19 10 50.3	15 23 18.8	2	367	Ep.		-- -- ----	-- -- ----	-	---		
June 2	42 Leonis	DD	-- -- ----	-- -- ----	-	---			12 55 32.2	8 13 59.4	2	235	Bn.	
July 18	o Piscium	RD	21 44 55.9	14 1 4.4	-	183	Ep.		-- -- ----	-- -- ----	-	---		
Aug. 9	37 Capricorni	DB	23 12 1.6	14 1 25.9	3	495	Ep.		-- -- ----	-- -- ----	-	---		
9	37 Capricorni	RD	0 27 51.6	15 17 3.4	3	495	Ep.		-- -- ----	-- -- ----	-	---		
Sept. 6	161 B. Capricorni	DD	20 28 1.3	9 27 46.9	2	495	Ep.		-- -- ----	-- -- ----	-	---		
6	161 B. Capricorni	RB	21 53 32.2	10 53 3.8	2	495	Ep.	l 2.	-- -- ----	-- -- ----	-	---		
1912														
Jan. 27	45 Arietis	DD	5 45 6.3	9 21 5.4	3	183	Hl.		5 45 6.2	9 21 5.3	2	160	Bn.	
27	45 Arietis	RB	6 54 27.3	10 30 15.1	3	183	Hl.	l 20 sc.	6 54 26.4	10 30 14.2	4	160	Bn.	vl sc.
31	134 B. Geminorum	DD	-- -- ----	-- -- ----	-	---			9 41 46.2	13 1 22.9	3	160	Ws.	
31	134 B. Geminorum	RB	10 25 0.1	13 44 29.8	3	183	Hl.	l 10.	10 24 59.7	13 44 29.4	3	160	Ws.	l 5 to 10.
Feb. 4	308 B. Leonis	DB	5 48 57.8	8 53 29.0	5	183	Hl.	w.	5 48 53.8	8 53 25.0	5	115	Ws.	
28	4 Cancri	DD	-- -- ----	-- -- ----	-	---			13 30 55.1	14 59 48.8	4	115	Ws.	h.
Mar. 27	υ^1 Cancri	DD	-- -- ----	-- -- ----	-	---			8 44 45.1	8 24 20.3	3	115	Ws.	c.
Apr. 4	169 B. Libræ	DB	13 1 1.6	12 8 27.5	4	183	Bn.		13 1 2.2	12 8 28.1	5	235	Ws.	
4	169 B. Libræ	RD	14 16 55.9	13 24 9.4	3	183	Bn.		14 16 57.2	13 24 10.7	3	115	Ws.	l 10 to 20.
4	177 B. Libræ	RD	14 44 15.4	13 51 24.4	3	183	Bn.		14 44 15.6	13 51 24.6	4	115	Ws.	
4	42 Libræ	DB	15 44 36.6	14 51 35.7	3	183	Hl.	B.	15 44 41.9	14 51 41.0	4	235	Ws.	
4	42 Libræ	RD	15 57 42.5	15 4 39.5	3	183	Hl.	C.	-- -- ----	-- -- ----	-	---		
23	λ Cancri	DD	-- -- ----	-- -- ----	-	---			13 5 16.6	10 57 59.6	3	---	Ws.	
23	λ Cancri	RB	13 48 26.3	11 41 2.2	2	183	Bn.		13 48 27.3	11 41 3.2	5	---	Ws.	l 7.
May 8	37 Capricorni	DB	18 49 21.7	15 42 9.6	4	183	Bn.		18 49 24.9	15 42 12.8	5	235	Ws.	
20	ω Cancri	DD	-- -- ----	-- -- ----	-	---			13 13 6.3	9 19 38.4	3	115	Ws.	
20	ω Cancri	RB	-- -- ----	-- -- ----	-	---			13 28 58.2	9 35 27.7	3	115	Ws.	l 10 to 20.
20	4 Cancri	DD	-- -- ----	-- -- ----	-	---			13 21 37.6	9 28 8.3	3	115	Ws.	
20	4 Cancri	RB	-- -- ----	-- -- ----	-	---			14 14 6.7	10 20 28.8	4	115	Ws.	l 20 to 30.
23	l Leonis	RB	12 58 27.8	8 53 14.6	2	183	Hl.		-- -- ----	-- -- ----	-	---		
29	31 B. Scorpii	DD	17 38 37.4	13 9 2.8	-	183	Hl.		17 38 37.7	13 9 3.1	4	115	Ws.	
July 27	ω Sagittarii	DD	-- -- ----	-- -- ----	-	---			22 12 51.5	13 50 33.2	3	115	Ws.	
27	ω Sagittarii	RB	-- -- ----	-- -- ----	-	----			23 11 [3.1	14 48 35.2	4	115	Ws.	
Aug. 3	ζ Piscium	DB	20 39 1.2	11 49 26.9	3	183	Hl.		20 39 1.7	11 49 27.4	3	115	Ws.	
3	ζ Piscium	RD	21 28 48.3	12 39 5.8	3	183	Hl.		21 28 48.5	12 39 6.0	3	115	Ws.	
3	B. D.+6° 175	DB	20 39 38.1	11 50 3.7	3	183	Hl.		20 39 42.3	11 50 7.8	3	115	Ws.	
3	B. D.+6° 175	RD	21 29 49.2	12 40 6.5	3	183	Hl.		21 29 49.4	12 40 6.7	3	115	Ws.	
Sept. 5	49 Aurigæ	DB	0 18 11.8	13 18 16.6	2	183	Bn.		0 18 12.0	13 18 16.8	4	160	Ws.	
5	49 Aurigæ	RD	1 8 9.1	14 8 5.6	2	183	Bn.		-- -- ----	-- -- ----	-	----		
5	54 Aurigæ	DB	-- -- ----	-- -- ----	-	----			2 18 53.8	15 18 38.8	2	115	Ws.	
5	54 Aurigæ	RD	-- -- ----	-- -- ----	-	----			2 42 1.9	15 41 43.1	2	115	Ws.	
5	B. D.+28° 1201	DB	2 20 18.0	15 20 2.8	3	183	Bn.		-- -- ----	-- -- ----	-	----		
5	B. D.+28° 1201	RD	3 22 34.0	16 22 8.6	3	183	Bn.		-- -- ----	-- -- ----	-	----		
29	ζ Arietis	DB	-- -- ----	-- -- ----	-	----			23 39 39.7	11 5 29.0	2	115	Ws.	c.
29	ζ Arietis	RD	-- -- ----	-- -- ----	-	----			0 39 58.0	12 5 37.4	3	115	Ws.	b.
Oct. 1	354 B. Tauri	DB	5 6 43.7	16 23 47.6	3	183	Bn.		5 6 40.4	16 23 44.3	3	115	Ws.	su.
1	354 B. Tauri	RD	6 27 22.6	17 44 13.3	2	183	Bn.		6 27 22.7	17 44 13.4	2	115	Ws.	t.
4	28 Cancri	DB	4 16 39.1	15 22 3.4	3	183	Bn.		4 16 39.9	15 22 4.2	4	235	Ws.	
4	28 Cancri	RD	5 13 20.9	16 18 35.9	3	183	Bn.		5 13 20.9	16 18 36.0	3	115	Ws.	k.
4	υ^1 Cancri	DB	5 55 40.4	17 0 48.5	2	183	Bn.		5 55 42.4	17 0 50.5	4	235	Ws.	
4	υ^1 Cancri	RD	6 25 58.4	17 31 1.5	2	183	Bn.		6 25 58.5	17 31 1.6	3	115	Ws.	k t.
25	19 Arietis	DB	-- -- ----	-- -- ----	-	----			5 17 23.4	15 0 3.7	2	115	Ws.	
25	19 Arietis	RD	-- -- ----	-- -- ----	-	----			6 27 49.4	16 10 18.2	2	160	Ws.	l 2 or 3.
27	104 B. Tauri	DB	22 16 45.8	7 52 43.1	3	183	Bn.		-- -- ----	-- -- ----	-	----		
27	104 B. Tauri	RD	22 51 6.7	8 26 58.4	3	183	Bn.		22 51 7.6	8 26 59.4	3	115	Ws.	l.
29	406 B. Tauri	RD	23 36 34.1	9 4 26.6	4	183	Bn.	u c.	23 36 32.6	9 4 25.2	3	115	Ws.	sl ob.
Nov. 20	171 B. Piscium	DD	2 37 57.2	10 38 49.9	2	183	Bn.	sl.	2 37 58.8	10 38 51.5	3	115	Ws.	sl.
20	171 B. Piscium	RB	3 55 13.7	11 55 53.8	2	183	Bn.		3 55 20.0	11 56 0.1	3	335	Ws.	
25	107 B. Aurigæ	DB	2 36 59.8	10 18 13.1	3	388	Bn.		2 36 54.6	10 18 8.0	4	335	Ws.	
25	107 B. Anrigæ	RD	3 15 46.3	10 56 53.3	4	388	Bn.	l h.	3 15 43.3	10 56 50.3	4	115	Ws.	sl h.
Dec. 19	19 Arietis	DD	3 3 18.5	9 10 5.6	3	388	Bn.		-- -- ----	-- -- ----	-	----		
19	19 Arietis	RB	4 6 45.7	10 13 22.4	4	388	Bn.	sc.	-- -- ----	-- -- ----	-	----		
24	47 Geminorum	RD	1 10 35.8	6 58 1.9	4	183	Bn.	sl.	1 10 37.3	6 58 3.3	5	115	Ws.	sl.
25	λ Cancri	DB	1 58 51.9	7 42 14.1	4	183	Bn.	p.	1 58 51.5	7 42 13.7	3	115	Ws.	su.
25	λ Cancri	RD	2 51 25.6	8 34 39.1	3	183	Bn.		2 51 25.6	8 34 39.2	3	115	Ws.	
28	σ Leonis	DB	-- -- ----	-- -- ----	-	----			7 5 57.8	12 36 42.0	4	160	Ws.	
28	σ Leonis	RD	8 0 37.2	13 31 12.4	2	183	Bn.		8 0 37.3	13 31 12.5	3	115	Ws.	k.
30	g Virginis	DB	12 53 31.6	18 15 26.9	3	388	Bn.		-- -- ----	-- -- ----	-	----		
30	g Virginis	RD	14 12 46.1	19 34 28.5	4	388	Bn.	d sc.	-- -- ----	-- -- ----	-	----		

A. Chronograph record poor. B. Early, probably 1[s], on account of mountains. C. Earlier 4^m to 5^m tban predicted.

Date	Object	Ph.	26-incb						12-inch					
			W. Sid. T.	W. M. T.	See-ing	Power	Obsr.	Rem.	W. Sid. T.	W. M. T.	Sec-ing	Power	Obsr.	Rem.
1913			h m s	h m s					h m s	h m s				
Jan. 19	406 B. Tauri	DD	10 32 4.0	14 35 44.3	3	388	Bn.		10 32 4.0	14 35 44.3	4	----	Ws.	
21	4 Cancri	DD	9 13 26.0	13 9 27.4	2	388	Bn.		9 13 26.2	13 9 27.6	2	115	Ws.	
21	4 Cancri	RB	10 18 18.3	14 14 9.1	2	388	Bn.	sl.	10 18 19.0	14 14 9.8	2	115	Ws.	l.
25	β Virginis	DB	-- -- ----	-- -- ----	-	----			6 54 44.7	10 35 25.1	3	160	Ws.	
Feb. 15	47 B. Aurigæ	DD	-- -- ----	-- -- ----	-	----			5 58 46.7	8 17 2.1	2	115	Ws.	
15	47 B. Aurigæ	RB	-- -- ----	-- -- ----	-	----			6 32 17.1	8 50 27.1	2	335	Ws.	sl.
15	354 B. Tauri	DD	11 16 20.2	13 33 43.7	3	183	Bn.	sh.	11 16 20.2	13 33 43.7	2	115	Ws.	
15	354 B. Tauri	RB	11 42 2.9	13 59 22.2	4	183	Bn.	l.	11 42 7.0	13 59 26.2	4	115	Ws.	
22	162 B. Virginis	DB	-- -- ----	-- -- ----	-	----			15 24 20.1	17 13 31.6	4	235	Ws.	
22	162 B. Virginis	RD	-- -- ----	-- -- ----	-	----			15 36 8.0	17 25 17.6	4	115	Ws.	sl.
25	47 G. Libræ	DB	13 16 20.8	14 54 5.5	4	388	Bn.	g b.	13 16 20.2	14 54 4.9	3	235	Ws.	h.
25	47 G. Libræ	RD	14 29 18.9	16 6 51.7	4	388	Bn.	h.	14 29 19.2	16 6 51.9	3	115	Ws.	h.
Mar. 12	47 Arietis	DD	-- -- ----	-- -- ----	-	----			6 6 17.6	6 46 14.2	2	115	Ws.	h r.
12	47 Arietis	RB	7 13 53.4	7 53 38.9	3	388	Bn.	h.	7 14 2.4	7 53 47.9	2	235	Ws.	l vh.
17	ω Cancri	RB	-- -- ----	-- -- ----	-	----			10 3 30.5	10 23 8.6	4	115	Ws.	l.
17	4 Cancri	DD	-- -- ----	-- -- ----	-	----			9 41 3.9	10 0 45.7	3	115	Ws.	
17	4 Cancri	RB	-- -- ----	-- -- ----	-	----			10 52 39.5	11 12 9.6	4	115	Ws.	
22	319 B. Virginis	DB	11 4 8.8	11 3 57.4	3	388	Bn.		11 4 4.1	11 3 52.7	3	235	Ws.	
22	319 B. Virginis	RD	11 41 39.7	11 41 22.2	3	388	Bn.	l.	-- -- ----	-- -- ----	-	----		
Apr. 17	89 Leonis	DD	-- -- --	-- -- ----	-	----			15 13 47.8	13 30 41.9	3	115	Ws.	
17	89 Leonis	RB	-- -- ----	-- -- ----	-	----			16 10 27.0	14 27 11.8	3	115	Ws.	
21	47 G. Libræ	DB	12 32 24.6	10 34 1.6	3	388	Bn.		12 32 22.4	10 33 59.4	4	160	Ws.	
21	47 G. Libræ	RD	13 43 13.8	11 44 39.1	3	388	Bn.		13 43 13.9	11 44 39.2	3	115	Ws.	
22	48 B. Scorpii	RD	12 48 25.8	10 46 4.3	3	183	Bn.		-- -- ----	-- -- ----	-	----		
22	65 B. Scorpii	DB	14 17 20.4	12 14 44.3	4	388	Bn.	g.	14 17 17.4	12 14 41.3	4	160	Ws.	h.
22	65 B. Scorpii	RD	15 33 31.6	13 30 43.0	3	388	Bn.		15 33 31.7	13 30 43.1	3	115	Ws.	
29	182 B. Aquarii	DB	18 48 55.3	16 18 3.3	4	183	Hl.	g.	18 48 49.9	16 17 57.9	4	115	Ws.	
June 12	f Virginis	DD	13 28 7.1	8 5 7.6	3	388	Bn.		-- -- ----	-- -- ----	-	----		
12	f Virginis	RB	14 38 46.1	9 15 35.0	3	388	Bn.	vl.	-- -- ----	-- -- ----	-	----		
24	317 B. Aquarii	DB	19 16 39.9	13 5 32.3	2	388	Bn.	sh.	19 16 36.3	13 5 28.7	4	160b	Ws.	
24	317 B. Aquarii	RD	20 3 24.5	13 52 9.2	2	388	Bn.		20 3 24.7	13 52 9.4	2	115	Ws.	
July 13	π Scorpii	DD	16 25 9.1	8 59 47.2	4	183	Hl.		16 25 9.2	8 59 47.3	4	235	Bn.	
13	π Scorpii	RB	17 50 16.0	10 24 40.2	4	183	Hl.	l 10.	17 50 17.8	10 24 42.0	3	160b	Bn.	
21	h Aquarii	DB	20 1 49.9	12 4 25.3	3	183	Hl.		20 1 51.8	12 4 27.2	3	235	Bn.	
21	h Aquarii	RD	20 59 43.6	13 2 9.5	3	183	Hl.		20 59 43.7	13 2 9.6	3	235	Bn.	
Aug. 8	17 G. Libræ	DD	-- -- ----	-- -- ----	-	----			17 3 6.8	7 55 25.1	2	115	Ws.	
Sept. 24	4 Cancri	DB	4 36 5.0	16 21 42.0	2	388	Bn.	r.	4 36 4.6	16 21 41.6	2	160b	Ws.	r.
24	4 Cancri	RD	5 31 6.7	17 16 34.7	2	388	Bn.	r.	5 31 6.8	17 16 34.8	2	115	Ws.	k.
Oct. 20	49 Aurigæ	DB	1 52 55.5	11 56 45.6	4	388	Hl.		1 52 55.3	11 56 45.5	3	160b	Ws.	
Nov. 17	134 B. Geminorum	DB	2 4 56.3	10 18 39.0	3	252b	Bn.	u.	2 4 58.8	10 18 41.5	3	160b	Ws.	
17	134 B. Geminorum	RD	3 8 50.5	11 22 22.7	3	388	Bn.	r.	3 8 50.7	11 22 22.9	3	115	Ws.	
20	34 Leonis	DB	5 58 17.3	13 59 34.0	3	252b	Bn.	i.	5 58 9.2	13 59 26.0	4	160b	Ws.	
20	34 Leonis	RD	6 23 25.2	14 24 37.8	3	183	Bn.	i r.	6 23 25.3	14 24 37.9	3	115	Ws.	k.
Dec. 5	96 Aquarii	DD	0 26 24.9	7 29 37.3	3	495	Bn.	r.	0 26 25.1	7 29 37.5	2	115	Ws.	k.
5	96 Aquarii	RB	1 46 29.3	8 49 28.6	4	252b	Bn.	sl.	-- -- ----	-- -- ----	-	----		
12	38 B. Aurigæ	DD	7 29 33.5	14 4 5.2	4	388	Bn.	g.	7 29 33.9	14 4 5.6	4	160b	Ws.	u.
12	38 B. Aurigæ	RB	8 42 15.3	15 16 35.1	4	183	Bn.	lp.	8 42 7.7	15 16 27.5	4	160b	Ws.	
13	406 B. Tauri	DB	0 1 34.2	6 33 23.4	3	252b	Bn.	g.	0 1 31.0	6 33 20.2	4	160b	Ws.	su.
13	406 B. Tauri	RD	1 0 11.7	7 31 51.3	3	252b	Bn.	r.	1 0 12.1	7 31 51.7	3	160b	Ws.	l.
15	35 B. Cancri	DB	11 56 3.4	18 18 3.7	4	252b	Bn.	gb.	11 56 0.6	18 18 0.9	3	160b	Ws.	b.
21	i Virginis	DB	-- -- ----	-- -- ----	-	----			10 34 15.3	16 32 53.5	2	160b	Ws.	
21	i Virginis	RD	-- -- ----	-- -- ----	-	----			11 44 25.3	17 42 52.0	2	115	Ws.	k.
1914														
Jan. 6	μ Arietis	DD	2 18 8.6	7 15 13.5	2	495	Bn.	r.	-- -- ----	-- -- ----	-	----		
6	μ Arietis	RB	3 40 56.2	8 37 47.5	2	252b	Bn.		3 41 0.9	8 37 52.2	2	160b	Ws.	i.
7	16 Tauri	DD	9 2 59.5	13 55 2.1	3	183	Bn.	h r.	9 2 59.6	13 55 2.2	2	115	Ws.	h.
7	q Tauri	DD	9 11 2.1	14 3 3.4	3	183	Bn.	b r.	9 11 2.2	14 3 3.5	3	115	Ws.	b.
7	20 Tauri	DD	9 28 48.8	14 20 47.2	4	183	Bn.	b.	9 28 49.0	14 20 47.4	3	115	Ws.	v fh.
10	49 Aurigæ	DD	5 19 20.6	10 0 12.2	4	252b	Bn.	r.	5 19 20.7	10 0 12.3	2	160b	Ws.	
10	49 Aurigæ	RB	6 10 31.3	10 51 14.5	4	252b	Bn.	sc.	6 10 33.1	10 51 16.3	4	160b	Ws.	sc.
12	γ Cancri	RD	-- -- ----	-- -- ----	-	----			9 36 20.7	14 8 38.3	4	160b	Ws.	l c.
13	8 Leonis	DB	6 46 58.3	11 15 47.8	4	252b	Bn.	g.	6 46 53.7	11 15 43.2	4	160b	Ws.	
13	8 Leonis	RD	-- -- ----	-- -- ----	-	----			8 0 32.2	12 29 9.6	4	160b	Ws.	
15	83 Leonis	DB	9 11 8.2	13 31 42.3	3	252b	Bn.	g.	9 11 2.8	13 31 36.9	3	160b	Ws.	
15	83 Leonis	RD	10 4 42.6	14 25 7.9	3	252b	Bn.	l.	10 4 41.3	14 25 6.6	3	115	Ws.	
15	τ Leonis	DB	10 2 25.4	14 22 51.1	2	252b	Bn.	r.	10 2 24.9	14 22 50.6	3	160b	Ws.	l.
15	τ Leonis	RD	10 35 50.5	14 56 10.7	3	252b	Bn.	sl b.	10 35 50.4	14 56 10.6	3	115	Ws.	
17	49 Virginis	DB	9 3 41.5	13 16 24.9	4	252b	Bn.	g.	9 3 36.3	13 16 19.7	4	160b	Ws.	vu.
17	49 Virginis	RD	9 57 28.2	14 10 2.8	3	183	Bn.	r.	9 57 28.3	14 10 2.9	4	115	Ws.	k.
Feb. 7	47 Geminorum	DD	8 11 48.6	11 2 6.3	3	388	Bn.		8 11 48.8	11 2 6.5	3	115	Ws.	
8	35 B. Cancri	DD	9 33 35.8	12 19 44.3	3	252b	Bn.	r.	9 33 35.8	12 19 44.3	4	115	Ws.	
8	35 B. Cancri	RB	10 13 20.0	12 59 22.0	4	252b	Bn.		10 13 23.2	12 59 25.2	4	160b	Ws.	
11	c Leonis	DB	7 29 3.0	10 3 44.1	4	252b	Bn.	g.	7 28 56.5	10 3 37.6	4	160b	Ws.	
11	c Leonis	RD	8 23 55.0	10 58 27.1	3	252b	Bn.	r.	8 23 55.1	10 58 27.2	4	160b	Ws.	

Date	Object	Ph.	26-inch W. Sid. T.	26-inch W. M. T.	26-inch Seeing	26-inch Power	26-inch Obsr.	26-inch Rem.	12-inch W. Sid. T.	12-inch W. M. T.	12-inch Seeing	12-inch Power	12-inch Obsr.	12-inch Rem.
			h m s	h m s					h m s	h m s				
1914 Feb. 17	135 B. Scorpii	DB	13 56 10.9	16 6 13.2	5	252b	Bn.	ugc.	13 56 15.0	16 6 17.3	4	160b	Ws.	vu.
17	135 B. Scorpii	RD	15 8 50.5	17 18 40.9	5	183	Bn.	u.	-- -- ----	-- -- ----	-	----		
Mar. 3	18 Tauri	DD	-- -- ----	-- -- ----	-	----			4 44 49.6	6 1 19.4	4	115	Ws.	
3	18 Tauri	RB	6 13 20.8	7 29 36.1	4	252b	Bn.		6 13 24.7	7 29 40.0	4	160b	Ws.	
8	γ Cancri	DD	9 48 56.4	10 44 56.9	3	388	Bn.	r.	9 48 56.9	10 44 57.4	3	115	Ws.	sl.
8	γ Cancri	RB	10 11 13.6	11 7 10.4	3	495	Bn.		10 11 21.2	11 7 18.0	3	160b	Ws.	l.
9	8 Leonis	DD	7 18 53.6	8 11 22.8	4	495	Bn.	sc.	-- ----	-- -- ----	-	----		
9	8 Leonis	RB	8 29 41.9	9 21 59.5	4	495	Bn.	sc.	-- -- ----	-- -- ----	-	----		
14	231 G. Virginis	RD	11 29 7.3	12 1 15.9	4	183	Bn.	sc.	11 29 8.0	12 1 16.6	4	115	Ws.	l.
14	236 G. Virginis	DB	11 15 49.8	11 48 0.6	4	252b	Bn.	ugc.	11 15 42.8	11 47 53.6	4	160b	Ws.	vu.
14	236 G. Virginis	RD	12 10 18.6	12 42 20.5	4	183	Bn.	h.	12 10 19.5	12 42 21.4	4	115	Ws.	
Apr. 7	c Leonis	RB	10 30 0.3	9 27 56.8	3	252b	Bn.	sc.	-- -- ----	-- -- ----	-	----		
9	ψ Virginis	DD	13 8 42.9	11 58 21.6	4	495	Bn.	g.	13 8 43.6	11 58 22.3	4	160b	Ws.	
9	ψ Virginis	RB	14 20 52.9	13 10 19.8	4	252b	Bn.		14 20 54.7	13 10 21.6	3	160b	Ws.	
12	b Scorpii	DB	11 42 34.1	10 20 39.2	4	252b	Bn.	ug.	11 42 33.2	10 20 38.3	4	160b	Ws.	vu.
12	b Scorpii	RD	12 38 6.6	11 16 2.6	4	495	Bn.	l.	12 38 6.8	11 16 2.8	4	115	Ws.	sl.
12	4 Scorpii	DB	13 58 21.9	12 36 4.8	4	252b	Bn.	g.	13 58 18.8	12 36 1.7	3	160b	Ws.	
12	4 Scorpii	RD	15 10 55.9	13 48 26.9	3	183	Bn.	r.	15 10 56.0	13 48 27.0	3	115	Ws.	
18	δ Capricorni	DB	17 11 10.9	15 24 46.7	4	252b	Bn.	g.	17 11 7.7	15 24 43.5	4	115	Ws.	
18	δ Capricorni	RD	18 0 20.1	16 13 47.8	3	495	Bn.	b.	18 0 20.1	16 13 47.8	4	115	Ws.	
May 1	5 B. Cancri	DD	-- -- ----	-- -- ----	-	----			12 22 31.3	9 45 47.6	2	115	Ws.	b.
8	43 H. Virginis	DD	-- -- ----	-- -- ----	-	----			10 59 14.9	7 55 13.4	3	160b	Bn.	sc.
8	236 G. Virginis	RB	-- -- ----	-- -- ----	-	----			13 26 29.7	10 22 4.1	4	160b	Bn.	l sc.
10	τ Scorpii	DB	-- -- ----	-- -- ----	-	----			18 56 24.2	15 43 12.8	3	160b	Ws.	
10	τ Scorpii	RD	-- -- ----	-- -- ----	-	----			19 51 55.0	16 38 34.5	4	115	Ws.	sl.
16	42 Aquarii	DB	17 20 1.4	13 43 30.3	4	252b	Bn.	ug.	-- -- ----	-- -- ----	-	----		
16	42 Aquarii	RD	18 22 57.4	14 46 16.0	3	183	Bn.		-- -- ----	-- -- ----	-	----		
17	81 Aquarii	DB	17 55 54.8	14 15 21.9	4	252b	Bn.	ug.	17 55 52.2	14 15 19.3	4	160b	Ws.	vu.
17	81 Aquarii	RD	19 5 23.1	15 24 38.8	3	388	Bn.		19 5 23.2	15 24 38.9	3	115	Ws.	k.
28	κ Geminorum	DD	12 26 54.4	8 4 0.4	2	388	Bn.	r.	-- -- ----	-- -- ----	-	----		
28	κ Geminorum	RB	13 24 48.3	9 1 44.8	3	252b	Bn.		-- -- ----	-- -- ----	-	----		
June 6	4 Scorpii	DD	14 34 54.5	9 36 16.3	3	252b	Bn.	r.	14 34 54.7	9 36 16.5	3	160b	Ws.	
6	4 Scorpii	RB	15 52 9.0	10 53 18.2	4	252b	Bn.	h.	15 52 11.9	10 53 21.1	4	160b	Ws.	
July 8	17 Capricorni	DB	19 5 31.4	12 0 19.6	3	252b	Bn.		19 5 30.6	12 0 18.9	3	160b	Ws.	
8	17 Capricorni	RD	20 29 17.8	13 23 52.3	3	252b	Bn.	r.	20 29 17.9	13 23 52.4	3	160b	Ws.	
15	20 H[1]. Arietis	DB	22 49 51.7	15 16 31.8	3	252b	Hl.		22 49 53.2	15 16 33.3	3	160b	Ws.	
17	16 Tauri	DB	21 15 34.2	13 34 38.0	4	183	Hl.	i.	-- -- ----	-- -- ----	-	----		
17	16 Tauri	RD	22 10 9.3	14 29 4.1	3	183	Hl.		22 10 9.2	14 29 4.0	3	115	Ws.	k.
17	17 Tauri	RD	-- -- ----	-- -- ----	-	----			21 44 16.2	14 3 15.3	-	160b	Ws.	g.
17	q Tauri	DB	21 32 5.0	13 51 6.0	3	183	Hl.		21 32 4.4	13 51 5.5	4	160b	Ws.	vu.
17	q Tauri	RD	-- -- ----	-- -- ----	-	----			22 28 45.7	14 47 37.5	3	115	Ws.	
17	B. D.+23° 504	RD	22 27 54.2	14 46 46.1	3	183	Hl.	i.	-- -- ----	-- -- ----	-	----		
17	20 Tauri	DB	21 43 34.4	14 2 33.6	3	183	Hl.		21 43 33.8	14 2 33.0	4	160b	Ws.	r.
17	20 Tauri	RD	22 38 57.0	14 57 47.1	3	183	Hl.	i.	22 38 57.1	14 57 47.2	3	115	Ws.	
17	21 Tauri	DB	21 53 16.7	14 12 14.3	3	183	Hl.		21 53 17.3	14 12 14.9	4	160b	Ws.	vu.
17	22 Tauri	DB	21 54 24.2	14 13 21.6	3	183	Hl.		21 54 25.3	14 13 22.7	4	160b	Ws.	vu.
Aug. 7	λ Aquarii	DB	20 0 41.7	10 57 23.6	4	252b	Hl.		20 0 37.4	10 57 19.3	3	160b	Ws.	
7	λ Aquarii	RD	21 19 56.8	12 16 25.6	4	183	Hl.		21 19 56.5	12 16 25.4	3	115	Ws.	
7	78 Aquarii	DB	21 38 10.4	12 34 36.4	4	252b	Hl.		21 38 9.4	12 34 35.3	3	160b	Ws.	
7	78 Aquarii	RD	-- -- ----	-- -- ----	-	----			22 59 39.8	13 55 52.4	3	115	Ws.	
30	τ Sagittarii	DD	19 37 30.9	9 3 50.6	3	183	Hl.		19 37 31.0	9 3 50.8	4	235	Ws.	
30	τ Sagittarii	RB	20 54 46.2	10 20 53.3	3	252b	Hl.		20 54 52.2	10 20 59.3	4	160b	Ws.	
Sept. 3	213 B. Aquarii	DD	2 27 50.3	15 37 19.2	4	183	Hl.	u.	2 27 55.1	15 37 24.0	4	160b	Ws.	u.
4	316 B. Aquarii	DB	-- -- ----	-- -- ----	-	----			20 28 53.4	9 35 25.2	3	160b	Ws.	
4	316 B. Aquarii	RD	-- -- ----	-- -- ----	-	----			21 46 5.2	10 52 24.3	3	160b	Ws.	sl.
12	406 B. Tauri	DB	1 20 8.2	13 54 25.0	4	252b	Hl.		1 20 9.8	13 54 26.6	4	160b	Ws.	
12	406 B. Tauri	RD	2 30 1.9	15 4 7.3	3	183	Hl.		2 30 1.8	15 4 7.2	4	115	Ws.	k.
14	κ Geminorum	DB	1 41 59.5	14 8 20.9	4	252b	Bn.		1 41 59.3	14 8 20.7	4	160b	Ws.	
14	κ Geminorum	RD	-- -- ----	-- -- ----	-	----			2 13 37.3	14 39 53.6	3	115	Ws.	
14	κ Geminorum, comp.	RD	2 13 13.7	14 39 30.0	2	183	Bn.		2 13 13.8	14 39 30.1	3	115	Ws.	
Nov. 5	354 B. Tauri	RD	-- -- ----	-- -- ----	-	----			8 5 41.2	17 6 32.6	3	160b	Bn.	sl
6	415 B. Tauri	DB	-- -- ----	-- -- ----	-	----			22 51 26.2	7 49 52.4	3	160b	Bn.	g.
6	415 B. Tauri	RD	23 33 58.6	8 32 17.8	2	183	Hl.		23 33 58.6	8 32 17.8	2	160b	Bn.	
7	39 Geminorum	RD	0 53 30.5	9 47 40.8	2	183	Hl.	h.	0 53 30.1	9 47 40.4	3	115	Bn.	f b.
11	49 Leonis	DB	-- -- ----	-- -- ----	-	----			4 34 16.2	13 12 6.7	4	160b	Bn.	u c.
11	49 Leonis	RD	-- -- ----	-- -- ----	-	----			5 1 36.7	13 39 22.7	3	235	Bn.	b.
Dec. 3	136 Tauri	DB	3 30 9.3	10 41 40.3	3	252b	Hl.	c.	3 30 9.6	10 41 40.6	3	160b	Bn.	u c.
3	136 Tauri	RD	4 58 10.0	12 9 26.6	3	183	Hl.	l c.	-- -- ----	-- -- ----	-	----		
23	21 Piscium	DD	-- -- ----	-- -- ----	-	----			23 45 11.4	5 38 40.9	3	235	Bn.	b.
23	21 Piscium	RB	1 8 43.0	7 1 58.9	3	252b	Hl.	b.	1 8 43.6	7 1 59.5	4	160b	Bn.	h.
1915 Jan. 1	A Geminorum	DB	2 39 49.2	7 57 27.0	3	252b	Hl.		2 39 49.4	7 57 27.2	3	160b	Bn.	g.
1	A Geminorum	RD	3 48 29.2	9 5 55.7	2	252b	Hl.		3 48 29.8	9 5 56.3	2	160b	Bn.	
2	η Cancri	DB	12 16 18.0	17 28 25.4	3	252b	Hl.	e 2.	12 16 16.8	17 28 24.2	4	160b	Bn.	se g.
8	75 Virginis	DB	12 31 9.6	17 19 39.0	2	252b	Hl.	c p.	12 31 9.5	17 19 38.9	3	160b	Bn.	u g c.
28	40 Geminorum	RB	2 40 53.9	6 12 21.8	3	252b	Hl.	l 5.	-- -- ----	-- -- ----	-	----		
28	39 Geminorum	RB	2 42 10.6	6 13 38.3	3	252b	Hl.	l 5.	-- -- ----	-- -- ----	-	----		
29	9 Cancri	DD	8 54 33.6	12 21 4.4	3	388	Bn.	c.	-- -- ----	-- -- ----	-	----		
Feb. 9	58 G. Sagittarii	RD	15 27 8.1	18 9 19.6	3	183	Hl.		15 27 8.1	18 9 19.6	3	235	Bn.	
25	181 B. Geminorum	RB	-- -- ----	-- -- ----	-	----			9 8 3.2	10 48 22.2	4	160b	Bn.	l c.
26	η Cancri	DD	7 32 51.8	9 9 30.5	3	252b	Hl.	i.	7 32 51.9	9 9 30.6	3	235	Bn.	

Date	Object	Ph.	26-inch W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.	12-inch W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.
1915			h m s	h m s					h m s	h m s				
Feb. 26	η Cancri	RB	8 30 51.9	10 7 21.1	3	252b	Hl.	i.	8 30 57.6	10 7 26.8	4	160b	Bn.	
26	102 B. Cancri	DD	-- -- ----	-- -- ----	-	----			12 10 55.2	13 46 48.4	4	235	Bn.	
26	102 B. Cancri	RB	-- -- ----	-- -- ----	-	----			13 13 5.1	14 48 48.1	4	160b	Bn.	
26	ε Cancri	DD	-- -- ----	-- -- ----	-	----			12 20 25.8	13 56 17.4	4	235	Bn.	
26	ε Cancri	RB	-- -- ----	-- -- ----	-	----			13 22 41.0	14 58 22.4	4	160b	Bn.	
Mar. 31	75 Virginis	DB	15 26 9.3	14 51 45.5	3	252b	Hl.		15 26 8.3	14 51 44.5	3	160b	Bn.	g.
31	75 Virginis	RD	16 33 49.8	15 59 14.9	3	252b	Hl.	l 2.	16 33 49.8	15 59 14.9	4	160b	Bn.	w.
Apr. 21	B. D.+23° 1810	DD	9 33 33.4	7 37 33.2	3	252b	Hl.		-- -- ----	-- -- ----	-	----		
21	82 Geminorum	DD	9 37 44.2	7 41 43.3	3	252b	Hl.		9 37 44.0	7 41 43.2	3	235	Bn.	sh.
21	82 Geminorum	RB	10 37 12.1	8 41 1.5	4	252b	Hl.	l.	10 37 6.5	8 40 55.9	3	160b	Bn.	sl.
May 5	ι Capricorni	DB	17 21 42.7	14 29 23.2	5	252b	Hl.	g.	17 21 48.6	14 29 29.1	4	160b	Bn.	g.
5	ι Capricorni	RD	18 33 48.8	15 41 17.5	3	183	Hl.		18 33 48.9	15 41 17.6	3	235	Bn.	
21	A Leonis	DD	14 30 23.8	10 35 37.8	4	183	Hl.		14 30 23.8	10 35 37.8	3	235	Bn.	c.
25	75 Virginis	DD	16 42 2.8	12 31 11.5	3	252b	Hl.	c.	16 42 2.8	12 31 11.5	4	235	Bn.	c.
June 4	13 Piscium	DB	20 24 35.7	15 33 48.9	4	252b	Hl.	g.	-- -- ----	-- -- ----	-	----		
4	13 Piscium	RD	21 20 42.4	16 29 46.4	3	183	Hl.	l 3 d.	21 20 41.8	16 29 45.8	3	115	Bn.	d.
19	359 B. Leonis	RB	13 52 39.2	8 3 57.9	4	252b	Hl.	l.	13 52 42.6	8 4 1.3	4	160b	Bn.	sl.
25	43 Ophiuchi	DD	20 16 3.1	14 2 43.5	4	252b	Hl.		-- -- ----	-- -- ----	-	----		
27	51 Sagittarii	DB	19 32 52.4	13 11 48.0	4	252b	Hl.	i.	19 32 53.2	13 11 48.8	4	160b	Bn.	g sh.
27	51 Sagittarii	RD	20 35 22.0	14 14 7.4	4	252b	Hl.	i.	20 35 22.4	14 14 7.8	3	160b	Bn.	
27	h Sagittarii	DB	19 37 8.6	13 16 3.5	4	252b	Hl.	i.	19 37 8.8	13 16 3.7	4	160b	Bn.	g sh.
27	h Sagittarii	RD	20 53 3.9	14 31 46.4	4	252b	Hl.	i.	20 53 4.3	14 31 46.8	3	160b	Bn.	
July 23	10 G. Sagittarii	DD	19 9 50.6	11 6 36.4	4	388	Bn.		-- -- ----	-- -- ----	-	----		
23	10 G. Sagittarii	RB	19 43 24.7	11 40 4.9	4	252b	Bn.		-- -- ----	-- -- ----	-	----		
26	Uranus	DB	23 42 30.6	15 26 43.9	4	252b	Bn.	u c.	-- -- ----	-- -- ----	-	----		
Aug. 21	h Sagittarii	RB	18 27 2.9	8 29 54.2	4	252b	Hl.	l 5.	18 27 2.9	8 29 54.2	4	160b	Bn.	
21	51 Sagittarii	DD	17 11 21.8	7 14 25.5	4	183	Hl.		17 11 21.8	7 14 25.5	4	235	Bn.	
21	51 Sagittarii	RB	17 52 3.5	7 55 0.6	4	252b	Hl.	l 5.	17 51 59.9	7 54 57.0	4	160b	Bn.	
23	42 Capricorni	DD	0 0 39.8	13 54 44.7	3	252b	Hl.		0 0 39.9	13 54 44.8	2	160b	Bn.	
23	42 Capricorni	RB	0 57 40.3	14 51 35.8	4	252b	Hl.	l.	0 57 41.4	14 51 36.9	4	160b	Bn.	
Sept. 21	197 G. Aquarii	DD	21 38 4.0	9 38 30.9	4	252b	Hl.	i.	21 38 4.6	9 38 31.5	3	115	B.	sl.
21	197 G. Aquarii	RB	22 45 18.1	10 45 34.0	4	252b	Hl.	l.	-- -- ----	-- -- ----	-	----		
27	16 Tauri	RD	-- -- ----	-- -- ----	-	----			21 49 26.3	9 26 15.9	3	115	Hl.	
27	17 Tauri	DB	-- -- ----	-- -- ----	-	----			20 54 28.3	8 31 26.9	5	160b	Hl.	g.
27	q Tauri	DB	-- -- ----	-- -- ----	-	----			21 16 18.8	8 53 13.8	3	160b	Hl.	g.
27	q Tauri	RD	-- -- ----	-- -- ----	-	----			22 0 8.5	9 36 56.3	3	115	Hl.	
27	20 Tauri	DB	-- -- ----	-- -- ----	-	----			21 20 57.6	8 57 51.8	3	160b	Hl.	g.
27	20 Tauri	RD	-- -- ----	-- -- ----	-	----			22 18 55.0	9 55 39.7	3	115	Hl.	
27	22 Tauri	DB	-- -- ----	-- -- ----	-	----			21 38 20.9	9 15 12.3	3	115	Hl.	g.
27	22 Tauri	RD	-- -- ----	-- -- ----	-	----			22 25 29.6	10 2 13.3	3	115	Hl.	
27	21 Tauri	DB	-- -- ----	-- -- ----	-	----			21 39 45.4	9 16 36.6	3	115	Hl.	g.
29	112 B. Aurigæ	DB	0 9 36.8	11 38 11.6	5	252b	Hl.	c.	-- -- ----	-- -- ----	-	----		
29	112 B. Aurigæ	RD	1 12 48.6	12 41 13.1	3	183	Hl.		-- -- ----	-- -- ----	-	----		
Oct. 2	B. D.+21° 1812	DB	3 19 21.1	14 35 37.1	3	252b	Hl.	g.	-- -- ----	-- -- ----	-	----		
2	49 B. Cancri	DB	3 28 53.9	14 45 8.3	3	252b	Hl.	g.	3 28 54.2	14 45 8.6	2	160b	Bn.	g.
2	49 B. Cancri	RD	4 37 11.1	15 53 14.3	3	388	Hl.		4 37 11.0	15 53 14.2	2	235	Bn.	
13	10 G. Sagittarii	DD	18 54 20.1	5 28 43.8	3	183	Hl.	t.	-- -- ----	-- -- ----	-	----		
13	10 G. Sagittarii	RB	20 10 43.9	6 44 55.1	4	252b	Hl.		20 10 44.3	6 44 55.5	4	160b	Bn.	h.
15	336 B. Sagittarii	DD	21 5 22.2	7 31 32.6	2	183	Bn.		-- -- ----	-- -- ----	-	----		
25	χ Tauri	DB	23 40 10.6	9 26 36.6	4	252b	Hl.		23 40 9.2	9 26 35.2	3	160b	Bn.	g A.
25	χ Tauri	RD	-- -- ----	-- -- ----	-	--			0 35 58.3	10 22 15.2	3	160b	Bn.	c.
25	B. D.+25° 707 n. f.	RD	0 36 57.5	10 23 14.2	4	252b	Hl.		0 36 57.8	10 23 14.5	3	160b	Bn.	sl.
30	χ Cancri	DB	8 21 34.8	17 46 55.8	4	252b	Hl.		-- -- ----	-- -- ----	-	----		
Nov. 24	ε Geminorum	DB	0 39 27.3	8 27 46.3	3	252b	Hl.		0 39 27.4	8 27 46.4	2	160b	Bn.	r.
24	ε Geminorum	RD	1 11 52.1	9 0 5.8	3	252b	Hl.	l.	1 11 51.7	9 0 5.4	2	235	Bn.	r.
25	187 B. Geminorum	DB	3 35 11.6	11 19 5.8	4	252b	Hl.		-- -- ----	-- -- ----	-	----		
25	187 B. Geminorum	RD	4 27 35.6	12 11 21.3	2	183	Hl.		-- -- ----	-- -- ----	-	----		
27	π Cancri	RD	-- -- ----	-- -- ----	-	----			3 1 38.0	10 37 45.9	4	235	Bn.	
Dec. 8	ψ Sagittarii	RB	22 24 11.2	5 17 49.6	4	183	Hl.	l.	22 24 7.0	5 17 45.4	4	160b	Bn.	
18	16 Tauri	RB	23 39 13.1	5 53 20.1	4	252b	Hl.		-- -- ----	-- -- ----	-	----		
18	q Tauri	DD	23 2 25.4	5 16 38.4	4	183	Hl.		23 2 25.3	5 16 38.3	4	160b	Bn.	w.
18	q Tauri	RB	23 51 25.2	6 5 30.2	4	252b	Hl.		23 51 29.6	6 5 34.5	4	160b	Bn.	l w.
18	20 Tauri	DD	23 5 44.0	5 19 56.4	4	183	Hl.		23 5 44.0	5 19 56.4	4	160b	Bn.	w.
18	22 Tauri	DD	23 27 29.2	5 41 38.1	4	183	Hl.		23 27 29.2	5 41 38.1	4	160b	Bn.	w.
18	22 Tauri	RB	-- -- ----	-- -- ----	-	----			0 22 57.0	6 36 56.8	4	160b	Bn.	l w.
18	21 Tauri	DD	23 29 53.8	5 44 2.3	4	183	Hl.		23 29 53.8	5 44 2.3	4	160b	Bn.	w.
18	21 Tauri	RB	0 14 41.1	6 28 42.2	4	252b	Hl.		0 14 39.4	6 28 40.6	4	160b	Bn.	l w.
21	ε Geminorum	DB	11 8 58.9	17 9 25.1	3	252b	Hl.	b.	11 8 58.0	17 9 24.2	3	160b	Bn.	g h.
21	ε Geminorum	RD	12 11 57.8	18 12 13.7	3	252b	Hl.	h.	12 11 57.6	18 12 13.5	3	160b	Bn.	b.
22	B. D.+23° 1744	DB	9 41 35.2	15 38 19.9	4	252b	Hl.		9 41 36.3	15 38 21.0	3	160b	Bn.	g.
22	B. D.+23° 1744	RD	10 55 14.8	16 51 47.4	4	252b	Hl.		10 55 14.6	16 51 47.2	3	160b	Bn.	
22	B. D.+23° 1744, s. f.	RD	-- -- ----	-- -- ----	-	----			10 55 20.0	16 51 52.6	3	160b	Bn.	
1916 Jan. 14	q Tauri	DD	9 38 52.6	14 5 11.7	4	183	Hl.		9 38 52.6	14 5 11.7	3	115	Bn.	
14	q Tauri	RB	-- -- ----	-- -- ----	-	----			10 36 48.7	15 2 58.3	4	160b	Bn.	
14	16 Tauri	DD	-- -- ----	-- -- ----	-	----			9 40 19.7	14 6 38.5	3	115	Bn.	

A. Double star.

Date	Object	Ph.	26-inch W. Sid. T.	26-inch W. M. T.	26-inch Seeing	26-inch Power	26-inch Obsr.	26-inch Rem.	12-inch W. Sid. T.	12-inch W. M. T.	12-inch Seeing	12-inch Power	12-inch Obsr.	12-inch Rem.
1916			h m s	h m s					h m s	h m s				
Jan. 14	16 Tauri	RB	-- -- ----	-- -- ----	-	----			10 12 37.9	14 38 51.4	4	160b	Bn.	
14	21 Tauri	DD	9 58 52.5	14 25 8.3	4	183	Hl.		9 58 52.4	14 25 8.2	3	115	Bn.	
14	20 Tauri	DD	-- -- ----	-- -- ----	-	----			10 0 23.4	14 26 38.9	3	115	Bn.	
14	20 Tauri	RB	-- -- ----	-- -- ----	-	----			10 47 48.5	15 13 56.3	5	160b	Bn.	
14	22 Tauri	DD	10 2 6.7	14 28 21.9	4	183	Hl.		10 2 6.8	14 28 22.0	3	115	Bn.	
18	48 Geminorum	DD	7 24 11.0	11 35 8.5	2	252b	Hl.		7 24 11.0	11 35 8.5	3	160b	Bn.	sc.
18	48 Geminorum	RB	-- -- ----	-- -- ----	-	----			8 50 33.1	13 1 16.5	2	160b	Bn.	
Feb. 14	ε Geminorum	DD	1 46 48.4	4 12 31.6	4	183	Hl.	g sc.	1 46 48.1	4 12 31.3	4	235	Bn.	g d.
14	ε Geminorum	RB	2 16 35.8	4 42 14.1	3	252b	Hl.	sl.	2 16 35.2	4 42 13.5	3	160b	Bn.	d.
14	ω Geminorum	DD	12 57 9.3	15 21 2.7	3	252b	Hl.	i.	12 57 8.9	15 21 2.3	4	235	Bn.	
Mar. 11	112 B. Aurigæ	DD	6 40 29.4	7 23 10.8	2	183	Hl.		6 40 29.5	7 23 10.9	2	235	Bn.	
11	112 B. Aurigæ	RB	7 13 32.2	7 56 8.2	2	252b	Hl.	l A.	7 13 28.6	7 56 4.6	2	160b	Bn.	
11	112 B. Aurigæ, f. s	DD	-- -- ----	-- -- ----	-	----			6 40 24.1	7 23 5.5	2	235	Bn.	
16	18 Leonis	RB	-- -- ----	-- -- ----	-	----			5 29 54.9	5 53 8.4	4	160b	Bn.	d.
16	19 Leonis	RB	-- -- ----	-- -- ----	-	----			6 22 38.2	6 45 43.1	4	160b	Bn.	
23	π Scorpii	DB	12 13 31.4	12 8 7.4	4	252b	Hl.		12 13 27.9	12 8 3.9	4	160b	Bn.	se h.
23	π Scorpii	RD	-- -- ----	-- -- ----	-	----			12 56 4.6	12 50 33.6	3	115	Bn.	sh.
23	65 B. Scorpii	DB	16 58 49.8	16 52 39.0	2	252b	Hl.		16 58 49.6	16 52 38.8	2	160b	Bn.	sh.
23	65 B. Scorpii	RD	18 6 39.9	18 0 18.0	3	183	Hl.	l h.	-- -- ----	-- -- ----	-	----		
24	95 G. Ophiuchi	DB	17 22 24.4	17 12 13.9	2	252b	Hl.	h.	17 22 24.0	17 12 13.5	2	160b	Bn.	f h tg.
June 13	b Scorpii	DD	19 16 15.9	13 47 18.0	4	388	Bn.		19 16 16.4	13 47 18.5	5	235	B.	vl.
18	29 Capricorni	DB	19 44 36.3	13 55 54.2	3	252b	Bn.	g.	19 44 35.3	13 55 53.2	2	160b	B.	g.
18	29 Capricorni	RD	21 0 56.4	15 12 1.8	3	388	Bn.		21 0 56.7	15 12 2.1	2	160b	B.	l 2.
21	22 Piscium	DB	20 51 33.4	14 50 52.7	4	252b	Bn.	g.	-- -- ----	-- -- ----	-	----		
21	22 Piscium	RD	21 6 14.0	15 5 30.8	4	252b	Bn.	sl.	-- -- ----	-- -- ----	-	----		
22	136 B. Piscium	DB	21 51 31.3	15 46 44.8	3	252b	Bn.	g.	-- -- ----	-- -- ----	-	----		
July 23	17 Tauri	DB	21 40 3.0	13 33 25.1	4	252b	Hl.	u h.	-- -- ----	-- -- ----	-	----		
23	B. D.+23° 536	DB	22 34 32.5	14 27 45.6	2	252b	Hl.		-- -- ----	-- -- ----	-	----		
23	B. D.+23° 536	RD	23 41 39.6	15 34 41.8	2	183	Hl.	l.	-- -- ----	-- -- ----	-	----		
23	η Tauri	DB	22 37 48.3	14 31 0.9	2	252b	Hl.		22 37 48.3	14 31 0.9	3	160b	Bn.	h r.
23	η Tauri	RD	-- -- ----	-- -- ----	-	----			23 43 4.5	15 36 6.4	2	160b	Bn.	h r.
23	23 Tauri	RD	23 1 5.6	14 54 14.4	2	183	Hl.		23 1 5.5	14 54 14.3	2	160b	Bn.	h r.
23	28 Tauri	DB	23 30 59.4	15 24 3.3	2	252b	Hl.		23 30 59.2	15 24 3.1	2	160b	Bn.	g h.
23	28 Tauri	RD	0 31 4.3	16 23 58.4	3	183	Hl.	h d.	0 31 4.1	16 23 58.2	3	160b	Bn.	h t.
23	27 Tauri	DB	23 36 20.9	15 29 23.9	2	252b	Hl.		23 36 21.0	15 29 24.0	2	160b	Bn.	h r.
23	27 Tauri	RD	-- -- ----	-- -- ----	-	----			0 15 6.2	16 8 2.9	3	160b	Bn.	h t.
Aug. 7	b Scorpii	DD	16 10 50.0	7 6 7.4	3	183	Hl.		16 10 50.0	7 6 7.4	4	235	Bn.	t.
7	b Scorpii	RB	17 31 3.5	8 26 7.8	4	252b	Hl.	l 3.	17 31 3.6	8 26 7.9	4	160b	Bn.	
10	189 B. Sagittarii	DD	17 54 27.5	8 37 40.2	3	252b	Hl.	c.	-- -- ----	-- -- ----	-	----		
12	29 Capricorni	DD	20 11 21.2	10 46 19.6	3	252b	Hl.		20 11 21.2	10 46 19.6	3	160b	Bn.	sc r.
12	29 Capricorni	RB	21 26 48.9	12 1 35.0	3	252b	Hl.		-- -- ----	-- -- ----	-	----		
24	Saturn's Ring I	DB	1 15 50.1	15 2 47.8	5	183	Hl.	e 20.	1 15 56.0	15 2 53.7	4	160b	Bn.	
24	Saturn I	DB	-- -- ----	-- -- ----	-	----			1 16 15.4	15 3 13.0	4	160b	Bn.	
24	Saturn II	DB	-- -- ----	-- -- ----	-	----			1 16 44.2	15 3 41.7	4	160b	Bn.	
24	Saturn's Ring II	DB	1 16 56.4	15 3 53.9	5	183	Hl.	e 20.	1 17 3.4	15 4 0.9	4	160b	Bn.	
24	Saturn's Ring III	RD	2 17 32.9	16 4 20.5	4	183	Hl.		2 17 32.1	16 4 19.7	4	235	Bn.	
24	Saturn III	RD	-- -- ----	-- -- ----	-	----			2 17 56.6	16 4 44.1	4	235	Bn.	
24	Saturn IV	RD	-- -- ----	-- -- ----	-	----			2 18 31.6	16 5 19.0	4	235	Bn.	
24	Saturn's Ring IV	RD	2 18 52.4	16 5 39.8	4	183	Hl.		2 18 52.0	16 5 39.4	4	235	Bn.	
Sept. 18	139 Tauri	DB	4 35 53.5	16 44 0.7	4	252b	Hl.	u.	4 35 48.5	16 43 55.7	4	160b	B.	vp.
18	139 Tauri	RD	5 4 26.1	17 12 28.6	4	252b	Hl.	l 2.	5 4 26.1	17 12 28.6	4	115	B.	l 2.
Oct. 5	o Capricorni	DD	-- -- ----	-- -- ----	-	----			23 9 37.5	10 11 47.7	4	160b	B.	l 1.
7	ρ Aquarii	DD	23 0 37.9	9 54 57.8	2	252b	Hl.	l 1.	23 0 38.2	9 54 58.1	4	160b	B.	l 2.
7	ρ Aquarii	RB	0 6 7.2	11 0 16.3	2	252b	Hl.		0 6 14.6	11 0 23.7	4	160b	B.	vl.
7	170 B. Aquarii	DD	1 17 18.4	12 11 15.9	3	252b	Hl.		-- -- ----	-- -- ----	-	----		
7	170 B. Aquarii	RB	2 18 12.2	13 11 59.7	3	252b	Hl.	l 20.	-- -- ----	-- -- ----	-	----		
12	μ Arietis	DB	-- -- ----	-- -- ----	-	----			23 47 40.1	10 22 12.7	3	160b	Hl.	
13	17 Tauri	DB	4 58 7.7	15 27 53.6	3	252b	Hl.		4 58 7.7	15 27 53.6	4	160b	B.	±50.
13	17 Tauri	RD	5 48 32.2	16 18 9.8	2	183	Hl.		5 48 32.4	16 18 10.0	4	160b	B.	l 1.
13	23 Tauri	DB	5 30 22.6	16 0 3.2	2	252b	Hl.		5 30 21.1	16 0 1.7	4	160b	B.	e 2.
13	23 Tauri	RD	6 52 17.4	17 21 44.5	2	183	Hl.		6 52 17.5	17 21 44.7	4	160b	B.	l 2.
13	η Tauri	DB	6 20 48.8	16 50 21.1	3	252b	Hl.		6 20 49.0	16 50 21.3	4	160b	B.	l 2.
13	η Tauri	RD	7 28 2.7	17 57 24.0	3	183	Hl.	l 2.	7 28 2.3	17 57 23.6	4	160b	B.	l 3.
13	27 Tauri	DB	7 13 31.7	17 42 55.3	3	252b	Hl.	t.	-- -- ----	-- -- ----	-	---		
13	27 Tauri	RD	-- -- ----	-- -- ----	--	---			8 23 20.4	18 52 32.6	4	115	B.	l 3 d.
13	28 Tauri	DB	7 19 35.9	17 48 58.5	4	252b	Hl.	t.	7 19 34.7	17 48 57.3	4	160b	B.	e 5.
13	28 Tauri	RD	-- -- ----	-- -- ----	--	---			8 20 37.0	18 49 49.7	4	115	B.	l 4 d.
19	o² Cancri	DB	-- -- ----	-- -- ----	--	---			4 11 33.5	14 17 51.6	4	160b	B.	l 5.
19	o² Cancri	RD	-- -- ----	-- -- ----	--	---			5 19 14.9	15 25 21.9	4	115	B.	l 2.
19	o¹ Cancri	DB	-- -- ----	-- -- ----	--	---			4 18 54.3	14 25 11.2	4	160b	B.	l 5.
19	o¹ Cancri	RD	-- -- ----	-- -- ----	--	---			5 14 10.1	15 20 17.9	4	115	B.	l 2.
Nov. 8	26 Arietis	DB	7 33 40.1	16 20 46.8	4	252b	Hl.	e 2.	-- -- ----	-- -- ----	--	---		
8	26 Arietis	RB	7 54 4.3	16 41 7.6	4	252b	Hl.	l 20.	-- -- ----	-- -- ----	--	---		
10	36 Tauri	DB	21 49 39.1	6 30 29.7	4	252b	Hl.		21 49 38.6	6 30 29.2	4	160b	Bn.	g.
10	36 Tauri	RD	22 47 6.3	7 27 47.4	4	252b	Hl.	l.	22 47 4.6	7 27 45.7	4	160b	Bn.	

A. Double star.

Date	Object	Ph.	26-inch						12-inch					
			W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.	W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.
1916			h m s	h m s					h m s	h m s				
Dec. 2	16 Piscium	DD	4 16 39.2	11 29 56.4	3	183	Hl.		4 16 39.3	11 29 56.5	4	115	B.	1 2.
5	47 B. Arietis	DD	4 49 58.9	11 51 22.8	3	252b	Hl.	A.	-- -- ----	-- -- ----	--	---		
5	47 B. Arietis	RB	-- -- ----	-- -- ----	--	---			6 5 19.4	13 6 31.0	4	160b	Bn.	w p.
6	ε Arietis	DD	3 55 36.8	10 53 13.7	4	252b	Hl.	B.	3 55 37.1	10 53 14.0	4	160b	B.	1 1½.
6	ε Arietis	RB	4 36 14.0	11 33 44.2	4	252b	Hl.		-- -- ----	-- -- ----	--	---		
7	27 Tauri	DD	1 14 39.8	8 8 47.2	3	252b	Hl.	c.	-- -- ----	-- -- ----	--	---		
7	27 Tauri	RB	1 54 15.2	8 48 16.1	3	252b	Hl.	1 5 c.	-- -- ----	-- -- ----	--	---		
26	π Capricorni	DD	23 54 37.5	5 34 15.7	4	183	Hl.		23 54 37.3	5 34 15.5	3	235	Bn.	r.
1917														
Jan. 6	5 Geminorum	RB	0 13 0.1	5 9 20.2	4	252b	Hl.	1 20.	-- -- ----	-- -- ----	--	---		
7	δ Geminorum	DE	9 46 1.8	14 36 52.2	3	252b	Hl:	r.	-- -- ----	-- -- ----	--	---		
7	δ Geminorum	RE	11 0 39.2	15 51 17.3	3	252b	Hl.		11 0 39.0	15 51 17.1	3	160b	Bn.	
8	85 Geminorum	RD	1 40 54.3	6 29 8.2	4	252b	Hl.	1 2½.	1 40 55.2	6 29 9.1	4	160b	B.	1 10.
8	217 B. Geminorum	DB	3 23 52.9	8 11 49.9	4	252b	Bn.	g h.	-- -- ----	-- -- ----	--	---		
9	54 Cancri	DB	5 36 39.3	10 20 18.7	4	252b	Bn.	g h.	-- -- ----	-- -- ----	--	---		
11	155 B. Leonis	RD	8 43 10.0	13 18 26.9	3	183	Hl.		8 43 10.2	13 18 27.1	4	115	B.	1 1½.
26	19 Piscium	DD	2 46 8.8	6 23 25.6	4	183	Hl.		2 46 8.9	6 23 25.7	4	115	B.	1 1.
26	19 Piscium	RB	3 51 51.3	7 28 57.3	4	252b	Hl.	1 5.	3 51 52.2	7 28 58.2	4	160b	B.	1 8.
30	66 Arietis	DD	-- -- ----	-- -- ----	--	---			9 17 31.8	12 38 0.9	3	235	Bn.	
30	66 Arietis	RB	-- -- ----	-- -- ----	--	---			10 3 29.2	13 23 50.7	4	160b	Bn.	u c.
Feb. 3	44 Geminorum	DD	10 58 0.1	14 2 29.0	4	252b	Hl.		10 58 0.2	14 2 29.1	4	160b	B.	1 2.
3	44 Geminorum	RB	12 3 55.3	15 8 13.4	4	252b	Hl.	1 2½.	12 3 57.7	15 8 15.8	4	160b	B.	1 20.
Mar. 6	83 B. Leonis	DD	9 16 49.5	10 19 41.8	2	252b	Hl.		9 16 49.6	10 19 41.9	4	235	Bn.	
6	83 B. Leonis	RB	10 17 20.7	11 20 3.1	2	252b	Hl.	1 5.	-- -- ----	-- -- ----	--	---		
6	89 B. Leonis	DD	11 7 38.0	12 10 12.1	2	252b	Hl.		11 7 38.0	12 10 12.1	3	235	Bn.	
6	89 B. Leonis	RB	12 26 33.0	13 28 54.2	2	252b	Hl.	1 5.	12 26 31.4	13 28 52.6	3	160b	Bn.	u.
6	π Leonis	DD	12 40 24.8	13 42 43.7	2	252b	Hl.		12 40 24.6	13 42 43.5	3	235	Bn.	
6	π Leonis	RB	13 53 45.4	14 55 52.3	2	252b	Hl.		13 53 44.3	14 55 51.2	3	160b	Bn.	1.
31	10 H. Cancri	DD	7 52 11.6	7 17 0.1	4	183	Bn.	h.	-- -- ----	-- -- ----	--	---		
Apr. 3	155 B. Leonis	DD	8 29 6.1	7 42 0.9	3	252b	Hl.		8 29 6.2	7 42 1.0	2	160b	B.	1 2.
3	155 B. Leonis	RB	-- -- ----	-- -- ----	--	---			9 53 38.0	9 6 19.0	2	160b	B.	1 3.
10	σ Scorpii	DB	16 9 8.2	14 53 16.3	4	253b	Hl.	h.	16 9 7.3	14 53 15.4	5	160b	B.	±10.
10	σ Scorpii	RD	17 30 26.5	16 14 21.2	4	183	Hl.		17 30 26.9	16 14 21.6	3	160b	B.	1 2 g.
10	σ Scorpii, pr	RD	17 29 32.6	16 13 27.5	4	183	Hl.		-- -- ----	-- -- ----	--	---		
14	σ Capricorni	RD	16 29 23.0	14 57 44.1	4	183	Bn.	h.	16 29 23.3	14 57 44.4	4	115	B.	1 2½.
May 10	191 B. Sagittarii	DB	18 46 1.1	15 31 46.1	4	252b	Bn.	u g.	18 46 2.3	15 31 47.3	3	160b	B.	±15.
June 25	p^3 Leonis	DD	14 18 33.4	8 4 10.4	3	183	Hl.	k t.	14 18 33.5	8 4 10.5	3	115	B.	1 1.
25	p^3 Leonis	RB	15 30 56.3	9 16 21.4	5	252b	Hl.	1 10	15 30 56.6	9 16 21.7	4	160b	B.	1 20± C.
July 4	222 B. Sagittarii	DB	19 37 34.0	12 46 55.5	3	252b	Hl.	se.	-- -- ----	-- -- ----	--	---		
4	222 B. Sagittarii	RD	20 52 30.9	14 1 40.1	3	252b	Hl.	1 10.	-- -- ----	-- -- ----	--	---		
Aug. 5	16 Piscium	RD	-- -- ----	-- -- ----	--	---			18 27 25.2	9 31 9.1	3	115	Bn.	
5	19 Piscium	DB	23 15 32.8	14 18 29.5	3	252b	Hl.	g	23 15 31.6	14 18 28.3	2	160b	Bn.	
5	19 Piscium	RD	0 31 13.3	15 33 57.6	2	183	Hl.		0 31 13.3	15 33 57.6	2	115	Bn.	
7	101 Piscium	DB	23 35 9.9	14 30 11.5	3	252b	Hl.		-- -- ----	-- -- ----	--	---		
10	B. D.+23° 683	RD	1 7 38.2	15 50 36.9	3	183	Hl.		-- -- ----	-- -- ----	--	---		
10	62 Tauri	DB	0 29 16.0	15 12 21.0	3	252b	Hl.		0 29 18.3	15 12 23.3	4	160b	B.	1 3±15.
10	62 Tauri	RD	-- -- ----	-- -- ----	--	---			1 9 37.5	15 52 35.9	3	115	B.	1 2.
28	222 B. Sagittarii	DD	20 16 43.5	9 49 43.5	3	495	Bn.		20 16 43.7	9 49 43.7	3	115	B.	1 2.
28	222 B. Sagittarii	RB	21 7 49.5	10 40 41.2	4	252b	Bn.		-- -- ----	-- -- ----	--	---		
Sept. 6	161 B. Tauri	DB	22 41 38.8	11 38 51.9	4	252b	Bn.	g h.	-- -- ----	-- -- ----	--	---		
6	161 B. Tauri	RD	23 43 32.6	12 40 35.6	4	183	Bn.		23 43 32.7	12 40 35.7	4	115	B.	1 3.
6	161 B. Tauri, ft. comp	RD	23 43 41.8	12 40 44.7	4	183	Bn.		-- -- ----	-- -- ----	--	---		
26	95 B. Capricorni	DD	0 18 47.2	11 57 6.2	3	183	Hl.		0 18 47.2	11 57 6.3	4	160b	B.	1 2.
26	95 B. Capricorni	RB	-- -- ----	-- -- ----	--	---			1 17 30.6	12 55 40.1	5	160b	B.	1 40 u.
29	19 Piscium	DD	0 16 27.9	11 42 59.6	2	252b	Hl.		0 16 28.0	11 42 59.7	3	160b	Bn.	
29	19 Piscium	RB	1 28 14.7	12 54 34.7	2	252b	Hl.	1 10 D.	1 28 12.6	12 54 32.6	3	160b	Bn.	h.
30	136 B. Piscium	DB	23 21 20.8	10 44 5.6	3	178b	Hl.		23 21 21.8	10 44 6.6	4	160b	Bn.	g.
30	136 B. Piscium	RD	0 33 22.3	11 55 55.3	4	178b	Hl.	1.	0 33 15.4	11 55 48.4	4	160b	Bn.	
Oct. 4	95 Tauri	DB	3 29 53.3	14 36 13.8	3	252b	Hl.	u c.	3 29 52.8	14 36 13.3	3	160b	Bn.	g sc.
4	95 Tauri	RD	4 56 42.7	16 2 48.9	2	183	Hl.	1 5 sc.	4 56 42.8	16 2 49.0	3	115	Bn.	sl sc.
7	61 Geminorum	DB	2 26 28.5	13 21 11.7	3	178b	Hl.		2 26 30.7	13 21 13.9	4	160b	Bn.	g h.
7	61 Geminorum	RD	3 16 28.7	14 11 3.7	3	183	Hl.		3 16 28.7	14 11 3.7	3	115	Bn.	
21	24 Sagittarii	RB	19 26 33.6	5 27 22.8	4	178b	Hl.	1.	19 26 26.3	5 27 15.5	5	160b	Bn.	t.
21	117 B. Sagittarii	DD	21 23 20.6	7 23 50.7	5	183	Hl.	g k.	21 23 20.6	7 23 50.7	5	235	Bn.	k.
21	117 B. Sagittarii	RB	-- -- ----	-- -- ----	--	---			22 31 40.8	8 31 59.7	5	160b	Bn.	
24	72 B. Aquarii	DD	21 59 47.7	7 48 24.2	4	183	Hl.	c.	21 59 47.8	7 48 24.3	5	115	Bn.	sc w.
Nov. 2	3 Geminorum	DB	2 19 2.5	11 31 33.3	3	178b	Hl.	g.	2 18 59.9	11 31 30.7	3	160b	Bn.	g.
2	3 Geminorum	RD	3 16 58.7	12 29 20.0	3	183	Hl.		3 16 58.7	12 29 20.0	3	115	Bn.	
3	120 B. Geminorum	DB	5 27 18.9	14 35 22.9	3	252b	Hl.	g.	5 27 17.2	14 35 21.2	3	160b	B.	±3.
3	120 B. Geminorum	RD	6 39 52.1	15 47 44.2	3	183	Hl.	1 2.	6 39 52.1	15 47 44.2	3	115	B.	1 2.
28	300 B. Tauri	DB	4 14 8.0	11 44 6.2	4	252b	Hl.	u h E.	4 13 58.0	11 43 56.3	4	160b	Bn.	g h.
28	300 B. Tauri	RD	-- -- ----	-- -- ----	--	---			4 46 16.3	12 16 9.3	4	160b	Bn.	u h.
Dec. 6	e Leonis	DB	7 8 5.1	14 6 7.6	3	252b	Hl.	i.	7 8 5.1	14 6 7.6	4	160b	B.	1 20±30.
6	e Leonis	RD	7 42 17.3	14 40 14.2	3	183	Hl.	c.	-- -- ----	-- -- ----	--	---		
27	3 Geminorum	RB	-- -- ----	-- -- ----	--	---			0 54 2.4	6 30 31.9	4	160b	Bn.	
27	6 Geminorum	DD	1 9 7.3	6 45 34.4	3	178b	Hl.		1 9 7.1	6 45 34.2	4	160b	Bn.	g.
27	6 Geminorum	RB	2 5 41.4	7 41 59.2	3	178b	Hl.		2 5 54.1	7 42 11.9	4	160b	Bn.	1 sc.

A. Considerably earlier than predicted. B. Earlier than predicted. Double star. C. Saw star 1ˢ± before time given. D. Very foggy. E. Fog.

Date	Object	Ph.	26-inch W. Sid. T.	26-inch W. M. T.	26-inch Seeing	26-inch Power	26-inch Obsr.	26-inch Rem.	12-inch W. Sid. T.	12-inch W. M. T.	12-inch Seeing	12-inch Power	12-inch Obsr.	12-inch Rem.
1918			h m s	h m s					h m s	h m s				
Jan. 19	20 H¹. Arietis	DD	4 46 54.8	8 52 20.3	4	183	Hl.	1 1 h.	4 46 54.8	8 52 20.3	3	235	Bn.	h.
21	161 B. Tauri, p. s	DD	3 22 4.6	7 19 52.1	3	178b	Hl.		-- -- ----	-- -- ----		---		
21	161 B. Tauri, f. s	DD	3 25 15.2	7 23 2.2	3	178b	Hl.		-- -- ----	-- -- ----	--	---		
21	161 B. Tauri	DD	3 25 17.4	7 23 4.4	3	178b	Hl.	1 2.	3 25 17.1	7 23 4.1	3	235	Bn.	
22	99 Tauri	DD	2 28 8.8	6 22 9.2	4	178b	Hl.	1 2 o.	2 28 8.5	6 22 8.9	3	115	B.	1 1½.
22	99 Tauri	RB	3 49 36.8	7 43 23.9	5	178b	Hl.		-- -- ----	-- -- ----	--	---		
Feb. 18	300 B. Tauri	DD	5 46 7.4	7 53 25.8	3	252b	Hl.	k.	5 46 7.5	7 53 25.9	3	235	Bn.	r.
18	300 B. Tauri	RB	7 9 17.9	9 16 22.7	2	178b	Hl.	1 20.	7 9 16.1	9 16 20.9	3	160b	Bn.	1 h.
26	e Leonis	DB	11 54 46.5	13 29 37.3	3	178b	Hl.		11 54 47.0	13 29 37.8	4	160b	Bn.	g.
26	e Leonis	RD	13 16 15.7	14 50 53.1	3	178b	Hl.		13 16 15.8	14 50 53.2	3	160b	Bn.	
28	370 B. Virginis	RD	9 13 55.8	10 41 21.1	4	183	Hl.	1 h.	9 13 56.1	10 41 21.4	4	160b	Bn.	f h.
Mar. 1	83 Virginis	DB	11 6 58.1	12 30 9.1	4	178b	Hl.	u.	11 6 58.6	12 30 9.6	5	160b	B.	±50.
1	83 Virginis	RD	12 19 22.8	13 42 21.9	3	178b	Hl.		12 19 22.9	13 42 22.0	4	160b	B.	1 1½.
17	72 Tauri	DD	-- -- ----	-- -- ----	--	---			7 26 6.8	7 46 59.4	3	115	Bn.	h.
17	72 Tauri	RB	-- -- ----	-- -- ----	--	---			8 33 21.1	8 54 2.7	4	160b	Bn.	
19	μ Geminorum	DD	7 18 11.3	7 31 13.4	3	183	Hl.	c.	7 18 11.4	7 31 13.5	2	115	Bn.	c.
19	μ Geminorum	RB	8 28 47.7	8 41 38.2	3	178b	Hl.	vl c.	-- -- ----	-- -- ----	--	---		
28	75 Virginis	DB	14 12 4.6	13 48 35.7	3	178b	Hl.		14 12 0.5	13 48 31.6	3	160b	Bn.	g.
28	75 Virginis	RD	15 0 16.5	14 36 39.7	3	178b	Hl.	1 2.	-- -- ----	-- -- ----	--	---		
29	43 H. Virginis	DB	9 50 55.0	9 24 13.0	4	178b	Hl.		9 50 57.9	9 24 15.9	4	160b	Bn.	g.
29	43 H. Virginis	RD	10 52 3.0	10 25 11.0	--	178b	Hl.	1.	10 52 3.0	10 25 11.0	3	160b	Bn.	
29	236 G. Virginis	DB	12 28 56.1	12 1 48.2	3	178b	Hl.		12 29 1.1	12 1 53.2	3	160b	Bn.	g.
29	236 G. Virginis	RD	12 59 1.1	12 31 48.3	2	178b	Hl.		12 59 1.1	12 31 48.3	3	160b	Bn.	
31	57 B. Scorpii	DB	14 40 20.9	14 4 59.7	4	178b	Hl.		14 40 16.3	14 4 55.1	4	160b	Bn.	g.
31	57 B. Scorpii	RD	16 10 36.6	15 35 0.6	4	183	Hl.	1 1.	16 10 36.7	15 35 0.7	4	115	Bn.	
31	27 G. Scorpii	DB	16 29 3.7	15 53 24.7	4	178b	Hl.	e.	16 29 3.0	15 53 24.0	4	160b	Bn.	g.
31	27 G. Scorpii	RD	17 58 43.8	17 22 50.1	3	183	Hl.	1 1 sc t.	17 58 43.7	17 22 50.0	4	115	Bn.	t.
Apr. 2	4 Sagittarii	DB	16 27 40.1	15 44 9.4	3	178b	Hl.	h.	-- -- ----	-- -- ----	--	---		
4	57 Sagittarii	DB	16 13 0.3	15 21 40.3	5	178b	Hl.	e.	16 13 7.7	15 21 47.7	4	160b	Bn.	g.
4	57 Sagittarii	RD	17 9 50.3	16 18 21.0	3	183	Hl.	1 1 k.	17 9 50.3	16 18 21.0	4	115	Bn.	
15	141 Tauri	DD	8 37 26.4	7 4 6.0	3	183	Hl.	e 1 k t.	8 37 26.3	7 4 5.9	2	115	Bn.	k.
15	141 Tauri	RB	-- -- ----	-- -- ----	--	---			9 31 49.1	7 58 19.8	3	160b	Bn.	
15	14 B. Geminorum	DD	12 11 36.6	10 37 41.1	4	183	Hl.	k.	12 11 36.6	10 37 41.1	4	115	Bn.	
22	13 B. Virginis	DD	16 27 50.2	14 25 41.4	4	178b	Bn.	±1 h.	16 27 50.4	14 25 41.6	4	160b	B.	1 1.
May 19	e Leonis	DD	13 14 20.1	9 26 33.4	3	183	Hl.	1 1.	13 14 20.3	9 26 33.6	2	115	Bn.	
19	e Leonis	RB	13 54 14.8	10 6 21.6	2	178b	Hl.	1 20.	13 54 8.0	10 6 14.8	2	160b	Bn.	
22	83 Virginis	DD	11 57 56.1	7 58 34.2	3	178b	Hl.		11 57 56.0	7 58 34.1	4	160b	Bn.	h.
26	191 B. Ophiuchi	DB	17 6 56.5	12 51 0.3	4	178b	Hl.		17 6 52.3	12 50 56.2	4	160b	Bn.	u g.
26	191 B. Ophiuchi	RD	18 30 13.0	14 14 3.2	3	178b	Hl.	c.	18 30 13.0	14 14 3.2	4	160b	Bn.	c.
26	b Ophiuchi	DB	17 55 11.6	13 39 7.5	4	178b	Hl.		17 55 13.8	13 39 9.7	4	160b	Bn.	u g.
June 19	43 H. Virginis	RB	14 5 42.7	8 15 54.3	3	178b	Hl.		-- -- ----	-- -- ----	--	---		
19	231 G. Virginis	DD	14 15 53.8	8 26 3.8	3	183	Hl.	1 2.	14 15 53.6	8 26 3.6	3	160b	Bn.	
19	231 G. Virginis	RD	15 42 56.0	9 52 51.7	3	178b	Hl.	1.	-- -- ----	-- -- ----	--	---		
19	236 G. Virginis	DD	15 26 21.4	9 36 19.8	4	183	Hl.		15 26 21.4	9 36 19.8	4	160b	Bn.	
19	236 G. Virginis	RB	16 51 14.1	11 0 58.6	3	178b	Hl.	1.	16 51 13.0	11 0 57.5	4	160b	Bn.	
23	4 Sagittarii	DD	16 51 37.5	10 45 38.3	3	178b	Hl.		16 51 37.6	10 45 38.4	4	160b	Bn.	
23	4 Sagittarii	RB	18 8 5.9	12 1 54.2	4	178b	Hl.	1.	18 8 1.6	12 1 49.9	4	160b	Bn.	
27	c² Capricorni	DB	18 23 57.8	12 1 59.9	3	178b	Hl.	c.	18 24 0.1	12 2 2.2	4	160b	Bn.	g sc.
27	c² Capricorni	RD	19 31 55.1	13 9 46.1	2	183	Hl.	1 2.	19 31 55.1	13 9 46.1	4	115	Bn.	h.
July 20	51 Ophiuchi	DD	15 20 45.9	7 28 52.0	4	178b	Hl.	t.	-- -- ----	-- -- ----	--	---		
20	51 Ophiuchi	RB	16 37 2.3	8 44 55.9	4	178b	Hl.	1 20.	-- -- ----	-- -- ----	--	---		
31	A Tauri	DB	23 53 12.3	15 16 39.4	4	178b	Hl.		23 53 11.4	15 16 38.5	3	115	B.	1 ±30 c.
Sept. 19	κ Piscium	DD	0 6 19.3	12 13 8.9	3	178b	Hl.	sc.	0 6 19.3	12 13 8.9	4	160b	Bn.	sc.
19	9 Piscium	DD	0 21 52.8	12 28 39.8	3	178b	Hl.	sc.	0 21 53.0	12 28 40.1	4	160b	Bn.	h.
24	67 Tauri	DB	-- -- ----	-- -- ----	--	---			0 15 17.5	12 2 26.1	3	160b	B.	1 10±20.
24	67 Tauri	RD	1 4 14.1	12 51 14.7	3	183	Bn.		-- -- ----	-- -- ----	--	---		
Nov. 8	ξ Sagittarii	DD	20 52 51.0	5 43 37.0	3	183	Bn.	k h.	20 52 51.2	5 43 37.1	4	115	B.	1 1.
8	ξ Sagittarii	RB	21 37 51.9	6 28 30.5	3	178b	Bn.	h.	-- -- ----	-- -- ----	--	---		
8	36 Sagittarii	DD	21 14 0.3	6 4 42.8	3	183	Bn.	h.	21 14 0.5	6 4 43.0	4	115	B.	1 1½.
18	247 B. Tauri	DB	1 11 46.8	9 22 31.2	4	178b	Bn.	g h.	-- -- ----	-- -- ----	--	---		
18	247 B. Tauri	RD	1 49 13.7	9 59 52.0	4	178b	Bn.		-- -- ----	-- -- ----	--	---		
25	55 Leonis	DB	5 55 2.0	13 37 28.6	5	178b	Bn.	g.	-- -- ----	-- -- ----	--	---		
25	55 Leonis	RD	7 0 32.2	14 42 48.1	5	183	Bn.	g.	7 0 32.5	14 42 48.4	4	115	B.	1 1 g.
Dec. 7	27 G. Capricorni	DD	-- -- ----	-- -- ----	--	---			23 4 47.8	6 1 10.6	4	115	Bn.	sc.
19	5 Cancri	DB	2 35 36.2	8 44 13.6	4	178b	Hl.		2 35 37.3	8 44 14.7	4	160b	Bn.	g.
19	5 Cancri	RD	3 37 26.0	9 45 53.3	3	178b	Hl.	1 3.	3 37 25.3	9 45 52.6	3	160b	Bn.	
1919														
Jan. 7	19 Piscium	DD	1 37 16.4	6 31 21.1	3	183	Hl.	k.	1 37 16.6	6 31 21.3	3	115	B.	1 1.
7	19 Piscium	RB	2 43 42.1	7 37 35.9	3	178b	Hl.	1 5.	-- -- ----	-- -- ----	--	---		
10	27 Arietis	DD	1 53 29.3	6 35 43.6	3	178b	Hl.		1 53 29.4	6 35 43.6	4	160b	B.	1 1½.
10	27 Arietis	RB	2 14 8.5	6 56 19.4	4	178b	Hl.	1 30.	-- -- ----	-- -- ----	--	---		
11	14 H¹. Tauri	DD	6 21 3.4	10 58 37.9	2	178b	Hl.		6 21 3.5	10 58 38.0	3	115	B.	1 1½.
11	14 H¹. Tauri	RB	-- -- ----	-- -- ----	--	---			7 4 7.2	11 41 34.6	3	115	B.	1 40±c.

Date	Object	Ph.	26-inch						12-inch					
			W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.	W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.*
1919			h m s	h m s					h m s	h m s				
Jan. 11	22 H¹. Tauri	DD	8 50 49.0	13 27 59.0	3	178b	Hl.		8 50 49.0	13 27 59.0	4	115	B.	1 1½.
11	22 H¹. Tauri	RB	-- -- ----	-- -- ----	-	----			9 34 15.2	14 11 18.0	4	115	B.	1 30±.
15	*f* Geminorum	DD	5 25 33.9	9 47 33.9	4	178b	Hl.		5 25 33.7	9 47 33.6	4	160b	B.	±30.
15	*f* Geminorum	RB	6 35 11.4	10 56 59.9	3	178b	Hl.	1 20.	6 35 10.7	10 56 59.2	3	160b	B.	1 20±.
19	p^3 Leonis	DB	7 0 18.2	11 6 19.0	4	178b	Hl.		-- -- ----	-- -- ----	-	----		
19	p^3 Leonis	RD	8 4 29.5	12 10 19.8	3	183	Hl.		-- -- ----	-- -- ----	-	----		
Feb. 8	51 Tauri	DD	-- -- ----	-- -- ----	-	----			4 35 1.6	7 22 48.0	3	115	Bn.	g sc.
8	56 Tauri	DD	-- -- ----	-- -- ----	-	----			5 31 13.4	8 18 50.6	3	115	Bn.	sc.
10	15 Geminorum, pr. comp.	DD	10 5 27.2	12 44 27.6	3	183	Hl.		-- -- ----	-- -- ----	-	----		
10	15 Geminorum	DD	10 6 14.2	12 45 14.5	3	183	Hl.	1 3.	10 6 14.3	12 45 14.6	3	115	Bn.	
10	15 Geminorum	RB	-- -- ----	-- -- ----	-	----			11 0 12.7	13 39 4.2	3	160b	Bn.	
10	16 Geminorum	DD	10 19 19.1	12 58 17.3	3	183	Hl.		10 19 19.1	12 58 17.2	3	115	Bn.	sc.
10	16 Geminorum	RB	-- -- ----	-- -- ----	-	----			11 15 20.0	13 54 9.0	4	160b	Bn.	
Mar. 11	2 B. Cancri	DD	7 46 26.1	8 31 48.0	3	183	Bn.	h.	-- -- ----	-- -- ----	-	----		
11	2 B. Cancri	RB	8 53 20.0	9 38 31.0	4	178b	Bn.		-- -- ----	-- -- ----	-	----		
12	α Cancri	DD	13 14 35.6	13 55 7.8	3	178b	Hl.		13 14 35.7	13 55 7.9	3	115	B.	1 1.
12	α Cancri	RB	13 57 14.4	14 37 39.6	3	178b	Hl.	vl c.	13 57 8.7	14 37 34.0	4	160b	B.	1 30±10 c.
24	128 B. Sagittarii	RD	15 11 5.0	15 4 7.3	3	183	Hl.	sl k.	15 11 5.0	15 4 7.2	3	160b	Bn.	
Apr. 8	A^1 Cancri	DD	13 18 37.1	12 12 59.2	3	183	Hl.	1 2.	13 18 37.2	12 12 59.3	4	115	B.	1 1.
9	ω Leonis	DD	-- -- ----	-- -- ----	-	----			10 31 5.1	9 21 58.7	4	115	B.	1 1½ c A.
21	226 B. Sagittarii	DB	16 7 4.7	14 9 52.4	4	178b	Hl.		16 7 3.9	14 9 51.6	4	160b	B.	±30.
21	226 B. Sagittarii	RD	17 29 19.5	15 31 53.7	3	183	Hl.		17 29 19.5	15 31 53.7	3	115	B.	1 1½.
May 17	14 Sagittarii	RD	18 40 3.4	15 0 12.4	4	183	Hl.	1 2.	18 40 3.2	15 0 12.2	4	115	Bn.	
June 2	60 Cancri	DD	13 36 50.6	8 54 54.7	3	183	Bn.		13 36 50.8	8 54 54.9	3	115	B.	1 1½.
16	27 G. Capricorni	DB	15 53 53.8	10 16 32.7	4	178b	Bn.	u g.	15 53 53.6	10 16 32.5	4	115	B.	±40.
16	27 G. Capricorni	RD	17 4 18.4	11 26 45.8	4	183	Bn.	1 sc.	-- -- ----	-- -- ----	-	----		
23	π Arietis	DB	21 11 55.1	15 6 10.5	4	178b	Bn.	g.	21 11 51.2	15 6 6.6	3	115	B.	e 10±20
23	π Arietis	RD	22 7 0.1	16 1 6.5	4	183	Bn.	k t.	22 7 0.3	16 1 6.7	3	115	B.	1 1½.
Aug. 7	14 Sagittarii	DD	20 38 28.7	11 35 53.7	4	178b	Bn.	vf c.	-- -- ----	-- -- ----	-	----		
11	c^1 Capricorni	DB	20 43 27.7	11 25 8.2	3	178b	Bn.	g h.	20 43 27.8	11 25 8.3	3	160b	B.	±20.
11	c^1 Capricorni	RD	22 1 14.0	12 42 41.7	3	178b	Bn.	h.	22 1 14.2	12 42 42.0	3	160b	B.	1 2.
18	ω Tauri	DB	0 49 2.2	15 2 31.1	3	178b	Bn.		-- -- ----	-- -- ----	-	----		
18	ω Tauri	RD	1 53 9.7	16 6 28.1	2	183	Bn.		1 53 10.0	16 6 28.4	3	115	B.	1 2.
Sept. 5	267 B. Sagittarii	DD	20 40 58.5	9 44 21.7	4	388	Bn.		-- -- ----	-- -- ----	-	----		
5	267 B. Sagittarii	RB	21 56 49.8	11 0 0.6	5	178b	Bn.		-- -- ----	-- -- ----	-	----		
16	χ^2 Orionis	DB	2 29 5.6	14 48 16.8	5	178b	Hl.	u.	2 29 5.2	14 48 16.4	5	160b	B.	±60.
16	χ^2 Orionis	RD	3 18 25.6	15 37 28.7	3	183	Hl.	k.	3 18 25.6	15 37 28.7	4	115	B.	1 1.
Oct. 6	κ Aquarii	DD	-- -- ----	-- -- ----	-	----			19 1 42.8	6 3 29.1	4	115	B.	1 1½.
6	κ Aquarii	RB	-- -- ----	-- -- ----	-	----			20 5 24.5	7 7 0.5	4	160b	B.	1 30±20.
6	207 B. Aquarii	DD	21 16 51.8	8 18 16.1	3	178b	Hl.	1 2.	21 16 51.8	8 18 16.0	4	115	B.	1 1.
6	207 B. Aquarii	RD	-- -- ----	-- -- ----	-	----			22 30 1.8	9 31 14.0	4	160b	B.	1 60±30 vf
Nov. 14	14 Sextantis	DB	-- -- ----	-- -- ----	-	----			5 6 31.0	13 33 17.9	5	160b	B.	±60.
14	14 Sextantis	RD	-- -- ----	-- -- ----	-	----			6 12 46.5	14 39 22.6	4	115	B.	1 1.
Dec. 10	60 Cancri	DB	6 19 48.2	13 4 9.4	4	178b	Hl.	e.	6 19 49.4	13 4 10.6	3	115	B.	±10
10	60 Cancri	RD	7 38 7.2	14 22 15.6	3	183	Hl.	1 2.	7 38 7.4	14 22 15.7	3	115	B.	1 2.
1920														
Jan. 5	162 B. Geminorum	DB	9 45 45.2	14 47 18.9	3	178b	Hl.		9 45 44.7	14 47 18.4	3	160b	B.	±20.
5	162 B. Geminorum	RD	-- -- ----	-- -- ----	-	----			10 33 51.9	15 35 17.7	3	160b	B.	1 50±50.
28	124 B. Arietis	DD	8 49 45.8	12 21 2.8	4	183	Hl.	k.	8 49 45.9	12 21 2.8	4	160b	B.	1 1.
31	203 B. Orionis ?	DD	-- -- ----	-- -- ----	-	----			7 4 34.6	10 24 21.1	3	160b	B.	1 1½.
31	203 B. Orionis ?	RB	-- -- ----	-- -- ----	-	----			8 0 33.2	11 20 10.5	3	160b	B.	B.
31	B. D.+19° 1110	RB	7 17 35.3	10 37 19.6	2	183	Hl.	l.	-- -- ----	-- -- ----	-	----		
31	χ^1 Orionis	DD	-- -- ----	-- -- ----	-	----			7 42 21.4	11 2 1.7	3	160b	B.	1 1.
31	χ^1 Orionis	RB	-- -- ----	-- -- ----	-	----			8 32 1.0	11 51 33.1	3	160b	B.	1 15.
31	64 Orionis	DD	11 47 44.2	15 6 44.3	3	183	Hl.	c u.	-- -- ----	-- -- ----	-	----		
Feb. 2	1 Cancri	DD	7 5 6.9	10 17 1.4	2	183	Hl.	o.	7 5 7.1	10 17 1.6	3	160b	B.	1 1.
2	1 Cancri	RB	8 18 20.8	11 30 3.4	3	183	Hl.	l.	8 18 24.3	11 30 6.8	3	160b	B.	1 25.
11	λ Libræ	DB	15 19 16.2	17 54 26.7	3	183	Hl.		15 19 16.0	17 54 26.4	4	160b	B.	±20.
11	λ Libræ	RD	16 53 7.7	19 28 2.8	3	183	Hl.	h d.	-- -- ----	-- -- ----	-	----		
26	282 B. Tauri	DD	9 25 46.0	11 2 55.8	4	183	Hl.	k w.	9 25 46.2	11 2 55.9	4	115	B.	1 1½.
26	B. D.+19° 740	DD	9 34 13.3	11 11 21.7	4	183	Hl.	k w.	9 34 13.5	11 11 21.9	4	115	B.	1 1.
Mar. 1	84 B. Cancri	DD	9 12 28.5	10 33 56.8	3	183	Hl.	1 1.	-- -- ----	-- -- ----	-	----		
1	84 B. Cancri	RB	10 25 45.2	11 47 1.4	3	183	Hl.	1 10.	-- -- ----	-- -- ----	-	----		
2	ω Leonis	DD	8 53 47.3	10 11 22.7	3	183	Hl.	C.	8 53 47.3	10 11 22.8	3	160b	B.	1 1½ D.
2	ω Leonis	RB	10 12 54.0	11 30 16.5	3	183	Hl.	1 10.	10 12 57.8	11 30 20.3	3	160b	B.	1 70±20.
29	κ Cancri	DD	-- -- ----	-- -- ----	-	----			7 42 4.7	7 13 42.4	4	115	B.	1 1 c.
29	κ Cancri	RB	-- -- ----	-- -- ----	-	----			9 4 39.8	8 36 4.0	4	160b	B.	1 30±15.
30	14 Sextantis	DD	12 6 51.3	11 33 49.8	3	183	Hl.	1 1 E.	12 6 51.6	11 33 50.0	4	115	B.	1 2.
30	14 Sextantis	RB	13 18 51.9	12 45 38.5	4	183	Hl.	1 30.	13 18 47.6	12 45 34.2	5	160b	B.	1 50±30.
Apr. 2	χ Virginis	DD	13 50 35.1	13 5 28.8	4	178b	Hl.		13 50 35.0	13 5 28.7	4	160b	B.	1 2.
2	χ Virginis	RB	14 21 47.1	13 36 35.7	4	183	Hl.	1 F.	-- -- ----	-- -- ----	-	----		
May 3	41 Libræ	DB	12 36 36.0	9 49 48.7	5	178b	Hl.	ve.	12 36 34.4	9 49 47.1	5	160b	B.	±30.
3	41 Libræ	RD	13 53 4.7	11 6 4.9	4	183	Hl.		13 53 5.0	11 6 5.2	5	160b	B.	1 2.
27	ψ Virginis	DD	12 45 10.5	8 24 0.0	3	183	Hl.		-- -- ----	-- -- ----	-	----		
31	58 G. Scorpii	DD	17 28 31.8	12 50 51.2	3	183	Hl.	u 10 f c.	-- -- ----	-- -- ----	-	----		

A. Star nearly disappeared about 3^s before disappearance, then brightened to normal.
B. Uncertain whether reappearance of same star. C. Partial disappearance $2^s.7$ earlier. D. $2^s.7$ before disappearance, star lost about half its light during about $\frac{1}{2}^s$, then brightened, perhaps to normal; sky apparently clear. E. Star fuzzy. F. Sidereal time may be 1^m earlier.

Date	Object	Ph.	26-inch W. Sid. T.	26-inch W. M. T.	26-inch Seeing	26-inch Power	26-inch Obsr.	26-inch Rem.	12-inch W. Sid. T.	12-inch W. M. T.	12-inch Seeing	12-inch Power	12-inch Obsr.	12-inch Rem.
1920			h m s	h m s					h m s	h m s				
May 31	58 G. Scorpii	RB	18 26 14.0	13 48 24.0	2	183	Hl.	1 20.	-- -- ----	-- -- ----	-	----		
June 9	λ Piscium	DB	18 49 28.4	13 36 11.3	5	178b	B.	±60.	-- -- ----	-- -- ----	-	----		
9	λ Piscium	RD	19 17 55.2	14 4 33.5	4	183	B.	1 1.	-- -- ----	-- -- ----	-	----		
27	β Scorpii	DD	19 19 46.5	12 55 38.1	5	178b	Hl.	A.	-- -- ----	-- -- ----	-	----		
27	56 B. Scorpii	DD	19 20 49.8	12 56 41.2	5	178b	Hl.		-- -- ----	-- -- ----	-	----		
July 2	β Capricorni	DB	-- -- ----	-- -- ----	-	----			22 48 16.1	16 3 54.0	4	160b	B.	±15.
25	123 B. Scorpii	DD	19 59 44.5	11 45 24.1	4	183	Hl.		-- -- ----	-- -- ----	-	----		
28	187 B. Sagittarii	DD	16 19 49.1	7 54 17.0	3	178b	Hl.	1 5 g.	16 19 49.0	7 54 16.9	4	160b	B.	1 1.
28	187 B. Sagittarii	RB	17 40 40.5	9 14 55.1	3	183	Hl.	1 10.	17 40 43.8	9 14 58.4	3	160b	B.	1 30±20.
Aug. 30	25 Piscium	DB	0 20 37.7	13 44 1.8	3	183	Hl.	vu vf c.	-- -- ----	-- -- ----	-	----		
30	25 Piscium	RD	1 16 34.3	14 39 49.3	3	183	Hl.	c u.	1 16 46.2	14 40 1.1	5	160b	B.	1 50± c.
Sept. 21	ρ Sagittarii	DD	18 37 34.2	6 35 24.5	2	183	B.	1 1.	-- -- ----	-- -- ----	-	----		
21	ρ Sagittarii	RB	20 7 41.2	8 5 16.8	3	178b	B.	1 15±10.	-- -- ----	-- -- ----	-	----		
Oct. 3	19 B. Geminorum	DB	3 28 26.4	14 37 39.0	2	183	Hl.		-- -- ----	-- -- ----	-	----		
3	19 B. Geminorum	RD	4 43 49.2	15 52 49.4	3	183	Hl.	k.	-- -- ----	-- -- ----	-	----		
6	κ Cancri	DB	3 45 8.3	14 42 30.4	4	183	Hl.	vu.	3 45 9.1	14 42 31.2	5	160b	B.	±20.
6	κ Cancri	RD	4 46 31.5	15 43 43.5	3	183	Hl.	1 2 k.	4 46 31.5	15 43 43.5	3	115	B.	1 1.
17	39 G. Sagittarii	RB	20 16 1.8	6 31 22.5	3	183	Hl.	1 5.	-- -- ----	-- -- ----	-	----		
25	60 Piscium	DD	21 6 45.8	6 50 30.9	3	183	Hl.	1 2 c.	-- -- ----	-- -- ----	-	----		
25	60 Piscium	RB	22 17 9.4	8 0 43.0	3	183	Hl.	1 5.	-- -- ----	-- -- ----	-	----		
29	302 B. Tauri	DB	0 57 3.2	10 24 27.0	4	183	Hl.	u 10 to 20.	-- -- ----	-- -- ----	-	----		
29	302 B. Tauri	RD	2 0 0.7	11 27 14.1	4	183	Hl.		-- -- ----	-- -- ----	-	----		
29	*i* Tauri	DB	3 42 56.9	13 9 53.5	4	183	Hl.		-- -- ----	-- -- ----	-	----		
29	*i* Tauri	RD	4 46 6.4	14 12 52.6	3	183	Hl.		-- -- ----	-- -- ----	-	----		
Nov. 25	85 H[1]. Tauri	DB	3 24 22.3	11 5 12.4	3	183	Hl.		-- -- ----	-- -- ----	-	----		
25	85 H[1]. Tauri	RD	4 19 10.3	11 59 51.4	3	183	Hl.	1 o.	-- -- ----	-- -- ----	-	----		
Dec. 15	c^1 Capricorni	DD	1 27 37.1	7 50 8.1	4	183	Hl.	k.	1 27 37.2	7 50 8.2	3	325	B.	1 1.
23	302 B. Tauri	DD	1 35 56.8	7 26 59.1	4	183	Hl.	1 2.	-- -- ----	-- -- ----	-	----		
23	302 B. Tauri	RB	2 37 35.5	8 28 27.7	5	183	Hl.	1 o.	-- -- ----	-- -- ----	-	----		
23	*i* Tauri	DD	4 23 0.6	10 13 35.6	3	183	Hl.		-- -- ----	-- -- ----	-	----		
1921														
Jan. 23	84 B. Cancri	DB	5 7 51.6	8 56 26.0	4	183	Hl.	e.	-- -- ----	-- -- ----	-	----		
23	84 B. Cancri	RD	6 18 31.2	10 6 54.0	3	183	Hl.	l.	-- -- ----	-- -- ----	-	----		
23	A^1 Cancri	DB	10 31 26.2	14 19 7.5	2	183	Hl.		-- -- ----	-- -- ----	-	----		
23	A^1 Cancri	RD	11 13 7.3	15 0 41.8	3	183	Hl.	l.	-- -- ----	-- -- ----	-	----		
23	A^2 Cancri	DB	12 24 47.0	16 12 9.8	3	183	Hl.		-- -- ----	-- -- ----	-	----		
23	A^2 Cancri	RD	13 23 7.9	17 10 21.1	3	183	Hl.	l.	-- -- ----	-- -- ----	-	----		
Feb. 15	162 B. Tauri	DD	7 21 47.0	9 39 33.5	3	183	Hl.	k.	-- -- ----	-- -- ----	-	----		
15	162 B. Tauri	RB	7 51 3.0	10 8 44.8	3	183	Hl.	1 20 f sc.	-- -- ----	-- -- ----	-	----		
16	*m* Tauri	DD	10 47 50.0	13 1 6.8	4	183	B.	1 1.	-- -- ----	-- -- ----	-	----		
20	κ Cancri	DD	9 0 28.5	10 58 19.3	3	183	Hl.	se.	-- -- ----	-- -- ----	-	----		
20	κ Cancri	RB	9 43 53.1	11 41 36.8	3	183	Hl.		-- -- ----	-- -- ----	-	----		
Apr. 11	68 Tauri	DD	8 26 52.4	7 8 13.4	3	183	Hl.	k.	8 26 52.5	7 8 13.5	3	115	B.	1 1.
11	68 Tauri	RB	9 27 17.0	8 8 28.1	3	183	Hl.	1 5.	9 27 16.1	8 8 27.2	4	160b	B.	1 40±20.
21	B. D.−12°3931	RE	16 30 2.8	14 30 45.6	3	183	Hl.	1 10 h.	16 30 15.2	14 30 57.9	3	115	B.	1 100±.
21	B. D.−11°3647	RE	16 39 48.0	14 40 29.2	3	183	Hl.	1 10 i h.	16 39 46.3	14 40 27.5	3	115	B.	1 15±.
21	B. D.−12°3932	DE	15 37 42.7	13 38 34.0	3	183	Hl.	c.	15 37 42.8	13 38 34.2	3	115	B.	1 1.
21	B. D.−12°3932	RE	16 56 1.5	14 56 40.0	3	183	Hl.	1 5 c.	16 56 1.7	14 56 40.2	3	115	B.	1 3.
21	B. D.−12°3941	DE	16 27 57.6	14 28 40.7	3	183	Hl.	c.	16 27 58.2	14 28 41.4	3	115	B.	1 2±3 vf.
21	B. D.−12°3940	DE	16 36 41.1	14 37 22.8	3	183	Hl.	i c.	16 36 41.2	14 37 22.9	3	115	B.	1 1.
21	B. D.−12°3942	DE	16 41 12.3	14 41 53.2	3	183	Hl.	i c.	16 41 11.9	14 41 52.8	3	115	B.	1 1½.
May 21	88 B. Scorpii	DB	12 33 0.9	8 36 25.3	4	183	Hl.	u f c.	-- -- ----	-- -- ----	-	----		
21	88 B. Scorpii	RD	13 27 6.1	9 30 21.6	4	183	Hl.	1 20 f c.	-- -- ----	-- -- ----	-	----		
July 18	ρ Sagittarii	DD	22 55 38.0	15 9 17.6	4	178b	B.	1 1½ f.	-- -- ----	-- -- ----	-	----		
Aug. 10	ζ Libræ	DD	19 5 31.9	9 49 23.2	4	183	B.	1 1.	-- -- ----	-- -- ----	-	----		
Sept. 18	ζ Piscium	DB	3 42 33.0	15 51 39.3	4	183	Hl.	c.	-- -- ----	-- -- ----	-	----		
18	ζ Piscium	RD	4 32 54.7	16 41 52.7	4	183	Hl.	1 c.	-- -- ----	-- -- ----	-	----		
18	ζ Piscium, f. n.	DB	3 43 31.8	15 52 37.9	4	183	Hl.	c.	-- -- ----	-- -- ----	-	----		
18	ζ Piscium, f. n.	RD	4 33 45.1	16 42 42.9	4	183	Hl.	c.	-- -- ----	-- -- ----	-	----		
Oct. 15	171 B. Piscium	DD	5 41 13.0	16 3 50.4	3	183	Hl.		5 41 13.1	16 3 50.5	4	160b	B.	1 1½.
20	115 Tauri	DB	5 32 11.1	15 35 10.4	4	183	Hl.	u.	-- -- ----	-- -- ----	-	----		
20	115 Tauri	RD	6 23 59.2	16 26 50.1	4	183	Hl.	1 1.	-- -- ----	-- -- ----	-	----		
21	292 B. Orionis	DB	2 56 45.7	12 56 14.6	3	183	Hl.		-- -- ----	-- -- ----	-	----		
21	292 B. Orionis	RD	4 8 5.6	14 7 22.7	3	183	Hl.		4 8 5.7	14 7 22.9	3	115	B.	1 2.
22	λ Geminorum	DB	2 14 2.2	12 9 42.2	3	183	Hl.		2 14 2.6	12 9 42.5	3	160b	B.	1 3.
22	λ Geminorum	RD	3 17 36.7	13 13 6.2	3	183	Hl.	1 2.	3 17 36.8	13 13 6.3	3	115	B.	1 1½.
22	λ Geminorum, f. n.	RD	3 17 45.5	13 13 15.0	3	183	Hl.		-- -- ----	-- -- ----	-	----		
Dec. 15	26 Geminorum	DB	5 59 58.3	12 22 42.1	3	183	Hl.		5 59 58.9	12 22 42.7	3	160b	B.	±20.
15	26 Geminorum	RD	7 18 48.4	13 41 19.4	3	183	Hl.	1 2.	7 18 48.4	13 41 19.4	3	160b	B.	1 1.

A. First disappearance 2s.6 earlier.

Date	Object	Pb.	26-inch W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.	12-inch W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.
1922			h m s	h m s					h m s	h m s				
Jan. 6	263 B. Piscium	RB	3 30 22.9	8 27 1.2	3	183	Hl.	vl c.	3 30 22.8	8 27 1.1	3	115	B.	1 30±20.
12	λ Geminorum	DD	9 12 2.8	13 44 9.6	4	183	Hl.		9 12 2.3	13 44 9.2	4	160b	B.	±5.
12	λ Geminorum	RB	10 6 40.4	14 38 38.3	3	183	Hl.	1 20 o.	10 6 36.5	14 38 34.4	4	160b	B.	1 8±5.
13	30 B. Cancri	DB	4 5 54.5	8 34 55.6	4	183	Hl.		-- -- ----	-- -- ----	-	----		
13	30 B. Cancri	RD	5 1 32.1	9 30 24.1	5	183	Hl.	vl o.	5 1 20.4	9 30 12.4	4	160b	B.	1 15±5.
14	209 B. Cancri	DB	3 13 22.1	7 38 35.9	5	183	Hl.	u.	-- -- ----	-- -- ----	-	----		
14	209 B. Cancri	RD	4 10 4.9	8 35 9.4	4	183	Hl.	1 2.	4 10 4.8	8 35 9.2	4	160b	B.	1 2.
Feb. 2	88 Piscium	DD	5 34 7.3	8 44 15.8	4	183	Hl.	gk.	-- -- ----	-- -- ----	-	----		
2	88 Piscium	RB	5 58 46.1	9 8 50.5	4	183	Hl.	vl vf c.	-- -- ----	-- -- ----	-	----		
8	26 Geminorum	DD	7 35 54.2	10 22 7.2	3	183	Hl.	o p.	7 35 54.2	10 22 7.2	2	115	B.	1 1½.
8	26 Geminorum	RB	8 49 11.0	11 35 12.1	3	183	Hl.	1 20 sc.	8 49 10.2	11 35 11.2	3	115	B.	1 30±10.
Mar. 8	λ Geminorum	DD	9 56 14.7	10 51 59.4	3	183	Hl.	1 1.	9 56 14.8	10 51 59.5	2	115	B.	1 1.
8	λ Geminorum	RB	11 3 21.1	11 58 54.7	3	183	Hl.	1 5.	11 3 21.3	11 58 55.0	3	160b	B.	1 5.
8	λ Geminorum, f. n	DD	-- -- ----	-- -- ----	-	---			9 56 27.2	10 52 11.9	2	115	B.	1 1.
12	75 Leonis	DD	10 23 40.1	11 3 36.7	2	183	Hl.		10 23 40.2	11 3 36.8	3	115	B.	1 1.
12	75 Leonis	RB	11 38 49.2	12 18 33.4	3	183	Hl.	1 5.	11 38 49.0	12 18 33.2	2	160b	B.	1 15±5.
12	76 Leonis	DD	11 36 40.3	12 16 24.9	2	183	Hl.		11 36 40.3	12 16 24.9	2	160b	B.	±3.
12	76 Leonis	RB	12 45 57.4	13 25 30.6	3	183	Hl.	1 20.	12 45 59.4	13 25 32.6	4	160b	B.	1 30±10.
12	79 Leonis	RB	-- -- ----	-- -- ----	--	---			15 10 24.8	15 49 34.3	4	160b	B.	1 20±10.
Apr. 8	35 Sextantis, p. s	DD	7 53 10.0	6 47 21.7	3	183	Hl.	c	-- -- ----	-- -- ----	--	---		
8	35 Sextantis, p. s	RB	9 2 1.0	7 56 1.4	3	183	Hl.	1 20 c.	-- -- ----	-- -- ----	--	---		
8	35 Sextantis	DD	7 53 15.3	6 47 27.0	3	183	Hl.	c.	7 53 15.4	6 47 27.1	4	115	B.	1 1.
8	35 Sextantis	RB	9 2 10.9	7 56 11.3	3	183	Hl.	1 10 c.	-- -- ----	-- -- ----	--	---		
12	μ Libræ	DB	16 48 20.0	15 25 20.4	4	183	Hl.	e.	16 48 23.3	15 25 23.8	4	160b	B.	±10.
12	μ Libræ	RD	17 56 27.3	16 33 16.6	3	183	Hl.	1 2.	17 56 27.4	16 33 16.6	3	160b	B.	1 1.
June 12	27 G. Capricorni	DB	19 22 49.6	13 59 34.3	3	183	Hl.		19 22 51.2	13 59 35.9	3	160b	B.	±10.
12	27 G. Capricorni	RD	20 41 52.6	15 18 24.4	3	183	Hl.	1 2.	20 41 52.9	15 18 24.6	3	115	B.	1 2.
July 8	ρ Sagittarii	DB	21 53 28.4	14 47 34.8	4	183	Hl.		-- -- ----	-- -- ----	--	---		
11	96 B. Aquarii	DB	22 29 47.8	15 12 0.4	3	183	Hl.		22 29 49.6	15 12 2.2	3	160b	B.	1 10±20.
11	96 B. Aquarii	RD	23 52 30.1	16 34 29.2	3	183	Hl.	1 1 t.	23 52 30.1	16 34 29.2	3	115	B.	1 2 d.
Aug. 6	τ Capricorni	DD	16 54 41.2	7 55 35.1	4	183	Hl.		-- -- ----	-- -- ----	--	---		
6	τ Capricorni	RB	18 14 40.8	9 15 21.6	3	183	Hl.	h.	-- -- ----	-- -- ----	--	---		
18	26 Geminorum	DB	1 29 7.0	15 41 25.7	4	183	Hl.	c.	-- -- ----	-- -- ----	--	---		
18	26 Geminorum	RD	2 13 34.1	16 25 45.6	3	183	Hl.	1 1 k c.	-- -- ----	-- -- ----	--	---		
28	θ Libræ	DD	17 32 16.8	7 6 34.5	3	183	B.	1 1.	-- -- ----	-- -- ----	--	---		
28	θ Libræ	RB	18 25 15.2	7 59 24.3	3	178b	B.	1 2.	-- -- ----	-- -- ----	--	---		
Sept. 12	70 Tauri	DB	23 41 53.6	12 16 12.2	5	178b	B.	±20.	-- -- ----	-- -- ----	--	---		
12	70 Tauri	RD	0 0 59.6	12 35 15.1	5	183	B.	1 3.	-- -- ----	-- -- ----	--	---		
12	75 Tauri	DB	1 0 45.3	13 34 51.0	5	178b	B.	±10.	-- -- ----	-- -- ----	--	---		
12	75 Tauri	RD	2 19 23.8	14 53 16.6	4	183	B.	1 2.	-- -- ----	-- -- ----	--	---		
12	α Tauri	DB	6 18 30.2	18 51 43.9	4	183	B.	1 1 d.	-- -- ----	-- -- ----	--	---		
12	α Tauri	RD	7 14 54.2	19 47 58.6	4	183	B.	1 1 d.	-- -- ----	-- -- ----	--	---		
13	111 Tauri	DB	2 44 3.7	15 13 56.5	5	178b	B.	±10.	-- -- ----	-- -- ----	--	---		
14	292 B. Orionis	DB	3 37 27.0	16 3 15.2	3	178b	B.	e 5±5.	-- -- ----	-- -- ----	--	---		
14	292 B. Orionis	RD	4 56 51.5	17 22 26.7	3	183	B.	1 1.	-- -- ----	-- -- ----	--	---		
15	λ Geminorum	DB	3 45 54.3	16 7 45.2	3	178b	B.	1 1.	-- -- ----	-- -- ----	--	---		
15	λ Geminorum	RD	4 25 41.2	16 47 25.6	3	183	B.	1 1.	-- -- ----	-- -- ----	--	---		
15	λ Geminorum, f. n	RD	4 26 22.9	16 48 7.2	3	183	B.	1 1.	-- -- ----	-- -- ----	--	---		
16	30 B. Cancri	RD	1 59 53.9	14 18 6.3	4	183	B.	1 1½.	-- -- ----	-- -- ----	--	---		
28	ρ Sagittarii	DD	21 25 37.4	8 57 23.9	3	183	Hl.	1 2.	-- -- ----	-- -- ----	--	---		
28	ρ Sagittarii	RB	22 34 16.0	10 5 51.2	4	183	Hl.	1 10.	-- -- ----	-- -- ----	--	---		
Oct. 1	96 B. Aquarii	DD	23 33 21.1	10 52 58.9	3	183	Hl.	g.	-- -- ----	-- -- ----	--	---		
1	96 B. Aquarii	RB	0 50 39.5	12 10 4.6	3	183	Hl.	1 10.	-- -- ----	-- -- ----	--	---		
3	316 B. Aquarii	DD	19 9 32.6	6 22 1.8	4	183	Hl.	1 2.	-- -- ----	-- -- ----	--	---		
3	316 B. Aquarii	RB	20 26 32.4	7 38 49.0	3	183	Hl.	1 20 f.	-- -- ----	-- -- ----	--	---		
Nov. 8	26 Geminorum	DB	5 9 51.4	13 59 9.6	4	183	Hl.		-- -- ----	-- -- ----	--	---		
8	26 Geminorum	RD	6 36 38.5	15 25 42.5	3	183	Hl.		-- -- ----	-- -- ----	--	---		
10	29 Cancri	DB	3 6 41.9	11 48 28.5	4	183	Hl.		-- -- ----	-- -- ----	--	---		
10	29 Cancri	RD	3 51 16.0	12 32 55.2	3	183	Hl.	1 2.	-- -- ----	-- -- ----	--	---		
24	53 B. Aquarii	DD	21 57 44.8	5 45 19.3	4	183	Hl.	c w.	-- -- ----	-- -- ----	--	---		
Dec. 22	λ Capricorni	DD	0 1 19.4	5 58 28.1	4	183	Hl.	k c.	0 1 19.6	5 58 28.3	3	115	B.	1 1½.
26	155 B. Piscium	DD	23 41 35.8	5 23 4.1	4	183	B.	1 1.	-- -- ----	-- -- ----	--	---		
1923														
Jan. 10	6 B. Libræ	DB	13 46 15.4	18 26 26.6	3	183	Hl.	t.	13 46 15.4	18 26 26.6	4	160b	B.	±10 f.
12	Venus III	RD	14 45 24.8	19 17 34.5	4	183	Hl.	1 15 b.	-- -- ----	-- -- ----	--	---		
19	150 B. Aquarii	DD	2 22 44.8	6 29 24.8	4	183	Hl.	k.	2 22 44.8	6 29 24.8	4	115	B.	1 1.
29	26 Geminorum	DD	11 46 57.2	15 12 45.7	4	183	Hl.	1 2 c.	-- -- ----	-- -- ----	--	---		
30	162 B. Geminorum	DD	7 24 52.4	10 47 27.9	2	183	Hl.	1 1.	7 24 52.6	10 47 28.2	3	115	B.	1 2.
30	162 B. Geminorum	RB	8 9 19.5	11 31 47.7	2	183	Hl.	1 20 sc.	8 9 18.1	11 31 46.3	4	160b	B.	1 30±20 f c.
Feb. 23	70 Tauri	DD	9 48 58.2	11 36 48.4	4	183	Hl.	k.	-- -- ----	-- -- ----	--	---		
Mar. 4	91 G. Virginis	RD	10 41 20.5	11 53 38.9	4	183	Hl.	1 2 w.	-- -- ----	-- -- ----	--	---		
20	25 Arietis	DD	7 37 42.5	7 47 36.4	4	183	Hl.	k.	7 37 42.7	7 47 36.7	4	196	B.	1 1½ k.
24	130 Tauri	DD	8 49 9.7	8 43 8.4	3	183	Hl.	k.	8 49 9.8	8 43 8.5	3	115	B.	1 1 k.
24	130 Tauri	RB	10 2 30.3	9 56 16.9	3	183	Hl.	1 10.	10 2 29.1	9 56 15.7	4	160b	B.	1 30±20.
28	ξ Leonis	DD	10 47 41.6	10 25 37.2	4	183	Hl.	1 2.	-- -- ----	-- -- ----	--	---		

Date	Object	Ph.	26-inch W. Sid. T.	26-inch W. M. T.	Seeing	Power	Obsr.	Rem.	12-inch W. Sid. T.	12-inch W. M. T.	Seeing	Power	Obsr.	Rem.
			h m s	h m s					h m s	h m s				
1923 Mar. 29	48 Leonis	DD	14 7 0.3	13 40 27.3	4	183	Hl.	1 1.	14 7 0.3	13 40 27.3	4	196	B.	1 1 c.
May 1	49 Libræ	DB	14 54 10.5	12 17 44.9	4	183	Hl.	u c.	-- -- ----	-- -- ----	--	---		
1	49 Libræ	RD	16 11 43.1	13 35 4.7	4	183	Hl.	h.	16 11 43.1	13 35 4.8	4	160b	B.	1 1.
2	90 B. Ophiuchi	DB	13 33 51.3	10 53 43.0	4	183	Hl.	u.	-- -- ----	-- -- ----	--	---		
2	90 B. Ophiuchi	RD	14 41 45.8	12 1 26.4	3	183	Hl.	1 1.	14 41 45.8	12 1 26.3	4	160b	B.	1 1½.
4	187 B. Sagittarii	DB	-- -- ----	-- -- ----	--	---			17 46 39.0	14 57 57.4	3	160b	B.	±5.
4	187 B. Sagittarii	RD	-- -- ----	-- -- ----	--	---			19 12 3.4	16 23 7.8	3	115	B.	1 2.
19	110 B. Geminorum	RB	11 38 17.1	7 51 37.2	2	183	Hl.	1 10.	-- -- ----	-- -- ----	--	---		
June 1	267 B. Sagittarii	DB	17 23 58.1	12 45 14.8	4	183	Hl.	u h.	17 23 57.5	12 45 14.2	4	160b	B.	±20.
1	267 B. Sagittarii	RD	18 45 56.5	14 6 59.7	3	183	Hl.	1 1 h.	18 45 56.7	14 6 59.9	4	115	B.	1 1½.
22	θ Virginis	RB	16 39 46.0	10 38 35.8	4	183	Hl.	1 20.	-- -- ----	-- -- ----	--	---		
25	49 Libræ	DD	14 9 34.3	7 57 1.0	3	183	Hl.	1 1.	14 9 34.3	7 57 1.0	4	115	B.	1 1.
July 9	γ Tauri	RD	23 13 52.2	16 4 47.0	4	183	Hl.	1 2 c t.	23 13 52.0	16 4 46.7	3	115	B.	1 1.
18	27 B. Virginis *	DD	15 32 47.6	7 49 34.7	4	183	Hl.	1 1.	15 32 47.6	7 49 34.7	4	115	B.	1 2.
18	27 B. Virginis	RB	15 50 46.5	8 7 30.6	4	183	Hl.	1 20.	15 50 45.5	8 7 29.6	4	115	B.	1 40±20 A.
19	38 Virginis	RB	16 0 49.5	8 13 36.0	4	183	Hl	1 20.	-- -- ----	-- -- ----	--	---		
26	267 B. Sagittarii	RB	16 13 0.0	7 58 13.2	5	183	Hl.	vl.	-- -- ----	-- -- ----	--	---		
27	61 B. Capricorni	DB	19 12 29.6	10 53 17.4	4	183	Hl.	h.	19 12 29.1	10 53 17.0	4	160b	B.	±20.
27	61 B. Capricorni	RD	20 37 47.1	12 18 21.0	3	183	Hl.	1 20.	-- -- ----	-- -- ----	--	---		
Aug. 30	39 B. Arietis	DB	21 40 39.0	11 7 21.8	3	183	Hl.	h.	21 40 40.7	11 7 23.4	3	160b	B.	±20.
30	39 B. Arietis	RD	22 53 29.3	12 20 0.1	2	183	Hl.	1 1 h.	22 53 29.5	12 20 0.3	2	115	B.	1 1.
30	64 Ceti	DB	2 47 28.1	16 13 20.6	2	183	Hl.	e 2 B.	2 47 30.2	16 13 22.7	2	160b	B.	±5.
30	64 Ceti	RD	4 10 3.3	17 35 42.3	3	183	Hl.	u B.	-- -- ----	-- -- ----	--	---		
Sept. 2	71 Tauri	RD	-- -- ----	-- -- ----	--	---			22 19 3.7	11 33 52.4	4	115	B.	1 1 k.
2	θ^2 Tauri	DB	22 32 57.7	11 47 44.2	4	183	Hl.		22 32 57.6	11 47 44.1	4	160b	B.	±10.
2	θ^2 Tauri	RD	23 34 22.3	12 48 58.7	4	183	Hl.	c.	23 34 22.3	12 48 58.7	3	115	B.	1 2 c.
2	θ^1 Tauri	DB	22 37 47.7	11 52 33.3	4	183	Hl.		22 37 48.2	11 52 33.8	4	160b	B.	±10.
2	θ^1 Tauri †	RD	-- -- ----	-- -- ----	--	---			23 28 49.0	12 43 26.3	3	115	B.	1 2 c.
2	264 B. Tauri	RD	0 25 37.4	13 40 5.4	3	183	Hl.	c.	0 25 37.8	13 40 5.8	3	115	B.	1 2 c.
2	α Tauri	DB	-- -- ----	-- -- ----	--	---			3 15 32.9	16 29 33.1	4	115	B.	±10 c.
29	48 Tauri	DB	2 5 43.4	13 33 45.6	4	183	Hl.		-- -- ----	-- -- ----	--	---		
29	48 Tauri	RD	3 1 16.0	14 29 9.0	3	183	Hl.	1 1.	-- -- ----	-- -- ----	--	---		
29	γ Tauri	DB	5 22 20.8	16 49 50.7	3	183	Hl.		-- -- ----	-- -- ----	--	---		
29	γ Tauri	RD	6 2 46.5	17 30 9.8	3	183	Hl.	1 2.	-- -- ----	-- -- ----	--	---		
Oct. 2	74 B. Geminorum	DB	1 57 9.1	13 13 24.9	4	183	Hl.		-- -- ----	-- -- ----	--	---		
2	74 B. Geminorum *	RD	2 24 46.2	13 40 57.5	3	183	Hl.	1 1.	-- -- ----	-- -- ----	--	---		
17	61 B. Capricorni	DD	19 57 46.2	6 16 2.4	2	183	Hl.	k.	-- -- ----	-- -- ----	--	---		
17	61 B. Capricorni	RB	21 24 8.6	7 42 10.6	3	183	Hl.	1 20.	-- -- ----	-- -- ----	--	---		
20	φ Aquarii	DD	22 34 41.0	8 40 43.7	3	183	Hl.	1 1.	-- -- ----	-- -- ----	--	---		
20	φ Aquarii	RB	0 2 15.9	10 8 4.3	3	183	Hl.	1 20.	-- -- ----	-- -- ----	--	---		
27	318 B. Tauri	DB	8 33 28.8	18 10 22.0	4	183	Hl.	sd.	-- -- ----	-- -- ----	--	---		
Nov. 2	A Leonis	DB	7 0 11.3	16 13 44.4	2	183	Hl.		7 0 11.4	16 13 44.5	2	160b	B.	1 2½ r.
2	A Leonis	RD	8 0 11.8	17 13 35.0	2	183	Hl.	1 2 k.	8 0 12.0	17 13 35.2	2	115	B.	1 1½ k.
3	c Leonis	DB	6 30 25.7	15 40 7.8	4	183	Hl.		6 30 25.6	15 40 7.7	4	160b	B.	±20.
3	c Leonis	RD	7 23 27.0	16 33 0.4	3	183	Hl.	1 2 k.	7 23 27.3	16 33 0.7	3	115	B.	1 2½ k.
20	39 B. Arietis	DD	23 0 21.0	7 4 26.4	3	183	Hl.	1 2.	23 0 21.1	7 4 26.4	3	160b	B.	1 1½.
20	39 B. Arietis	RB	0 18 43.6	8 22 36.0	2	183	Hl.	1 20.	0 18 38.8	8 22 31.3	3	160b	B.	1 30±10.
20	64 Ceti	DD	4 19 31.7	12 22 44.7	3	183	Hl.	1 2.	4 19 31.6	12 22 44.7	3	160b	B.	1 2.
20	ξ^1 Ceti	DD	5 43 22.1	13 46 21.4	3	183	Hl.	1 1.	5 43 22.4	13 46 21.7	3	160b	B.	1 2.
20	ξ^1 Ceti	RB	6 44 57.3	14 47 46.5	3	183	Hl.	1 10.	6 44 56.2	14 47 45.4	4	160b	B.	1 40±20.
24	115 Tauri	DB	5 29 44.8	13 17 2.6	4	178b	B.	±20.	-- -- ----	-- -- ----	--	---		
24	115 Tauri	RD	6 54 39.0	14 41 43.0	4	178b	B.	1 2.	-- -- ----	-- -- ----	--	---		
Dec. 12	151 B. Capricorni	DD	22 24 45.4	5 2 26.5	3	183	Hl.		22 24 45.5	5 2 26.6	2	115	B.	1 1.
12	151 B. Capricorni	RB	23 43 9.5	6 20 37.8	3	183	Hl.	1 20.	-- -- ----	-- -- ----	--	---		
18	85 Ceti	DD	4 51 21.6	11 4 23.9	3	183	Hl.		-- -- ----	-- -- ----	--	---		
18	85 Ceti	RB	6 5 48.4	12 18 38.5	3	183	Hl.	1 10.	-- -- ----	-- -- ----	--	---		
24	f Geminorum	DB	1 35 4.0	7 25 3.1	5	183	Hl.		-- -- ----	-- -- ----	--	---		
24	f Geminorum	RD	2 35 23.4	8 25 12.6	3	183	Hl.	1 2.	2 35 23.4	8 25 12.5	4	160b	B.	1 2.
1924 Jan. 14	389 B. Ceti	DD	7 44 58.4	12 11 22.7	3	183	Hl.		7 44 58.4	12 11 22.7	3	115	B.	1 1.
30	24 Scorpii	DB	14 5 11.8	17 27 39.3	4	183	Hl.	c.	14 5 11.2	17 27 38.6	4	115	B.	1 5±10.
30	24 Scorpii	RD	15 20 44.4	18 42 59.4	3	183	Hl.	1 2 k h t.	15 20 44.4	18 42 59.5	3	115	B.	1 1 k t.
Feb. 9	f Piscium	DD	3 47 22.9	6 32 12.4	2	183	Hl.	k.	3 47 22.9	6 32 12.4	2	115	B.	1 1 k.
9	f Piscium	RB	4 57 10.7	7 41 48.8	2	183	Hl.	1 20.	-- -- ----	-- -- ----	--	---		
10	39 B. Arietis	DD	4 35 45.6	7 16 31.3	3	183	Hl.	k w.	-- -- ----	-- -- ----	--	---		
10	39 B. Arietis	RB	5 25 56.4	8 6 33.9	4	183	Hl.	1 30 w.	-- -- ----	-- -- ----	--	---		
13	70 Tauri	RB	3 52 24.1	6 21 29.2	2	183	Hl.	1 30.	-- -- ----	-- -- ----	--	---		
13	θ^1 Tauri	DD	4 41 19.6	7 10 16.7	2	183	Hl.	k.	4 41 19.7	7 10 16.8	3	115	B.	1 1 k.
13	75 Tauri	DD	5 7 6.9	7 35 59.7	2	183	Hl.	k.	5 7 7.0	7 35 59.8	3	160b	B.	1 1½.
13	264 B. Tauri	RB	7 32 59.7	10 1 28.6	2	183	Hl.	1 10.	7 32 59.7	10 1 28.7	3	160b	B.	1 3.
13	275 B. Tauri	DD	8 13 22.0	10 41 44.3	3	183	Hl.	k.	8 13 22.0	10 41 44.4	3	115	B.	1 1 k.
13	α Tauri	DD	9 43 21.1	12 11 28.7	4	183	Hl.	c.	9 43 21.1	12 11 28.7	4	115	B.	1 1½ c.
13	α Tauri	RB	-- -- ----	-- -- ----	--	---			10 27 49.0	12 55 49.4	4	115	B.	1 2 c.
14	115 Tauri	DD	10 28 38.3	12 52 42.6	4	183	Hl.		-- -- ----	-- -- ----	--	---		
14	115 Tauri	RB	11 12 46.3	13 36 43.4	5	183	Hl.		-- -- ----	-- -- ----	--	---		

A. Saw 1^s earlier than given time. B. Foggy.
*Possibly wrong star or time 1^m wrong. † Possibly wrong star.

Date	Object	Ph.	26-inch W. Sid. T.	26-inch W. M. T.	Seeing	Power	Obsr.	Rem.	12-inch W. Sid. T.	12-inch W. M. T.	Seeing	Power	Obsr.	Rem.
1924			h m s	h m s					h m s	h m s				
Feb. 15	19 B. Geminorum	DD	7 25 27.0	9 46 5.3	3	183	Hl.		7 25 27.1	9 46 5.4	3	115	B.	1 1½.
15	19 B. Geminorum	RB	8 27 5.2	10 47 33.5	3	183	Hl.	1 20.	8 27 0.6	10 47 28.9	4	160b	B.	1 40±20 A.
18	54 Cancri	DD	5 33 42.1	7 42 51.0	3	183	Hl.	1 1.	5 33 42.2	7 42 51.2	3	160b	B.	1 1½.
18	54 Cancri	RB	6 45 30.5	8 54 27.7	3	183	Hl.	1 20 c.	-- -- ----	-- -- ----	--	---		
23	65 Virginis	RD	8 58 29.7	10 47 25.6	3	183	Hl.		8 58 29.6	10 47 25.5	4	115	B.	1 2.
23	66 Virginis	DB	8 41 23.9	10 30 22.6	5	183	Hl.		-- -- ----	-- -- ----	--	---		
23	66 Virginis	RD	9 41 18.4	11 30 7.3	3	183	Hl.		9 41 18.0	11 30 6.9	4	115	B.	1 2.
23	*l* Virginis	DB	13 49 42.4	15 37 50.6	2	183	Hl.		13 49 40.6	15 37 48.8	3	115	B.	±8.
23	*l* Virginis	RD	14 15 11.1	16 3 15.1	2	183	Hl.	1 2.	14 15 11.4	16 3 15.3	3	115	B.	1 2.
Mar. 14	74 B. Geminorum	DD	10 36 53.2	11 6 54.8	3	183	Hl.	1 1.	10 36 53.2	11 6 54.8	3	115	B.	1 1.
14	74 B. Geminorum	RB	11 16 22.3	11 46 17.5	3	183	Hl.	1 20.	11 16 20.8	11 46 16.0	3	160b	B.	1 40±20 A.
14	74 B. Geminorum, 8^m p. s.	DD	10 38 41.2	11 8 42.5	3	183	Hl.	1 2.	-- -- ----	-- -- ----	--	---		
15	*f* Geminorum	DD	10 6 29.0	10 32 39.7	3	183	Hl.	1 1 c.	10 6 29.0	10 32 39.8	4	115	B.	1 2 c.
15	*f* Geminorum	RB	11 21 47.1	11 47 45.5	4	183	Hl.	1 20 h.	11 21 45.5	11 47 43.9	4	160	B.	1 30±20 cB.
27	190 B. Sagittarii	RD	17 30 53.6	17 8 40.6	4	183	Hl.	1 1 k.	17 30 54.0	17 8 41.1	4	118	B.	1 2.
Apr. 26	B. D.−14° 6101	RD	18 59 54.1	16 39 29.4	4	183	B.	1 2 t.	-- -- ----	-- -- ----	--	---		
May 22	π Capricorni	DB	18 53 2.0	14 50 24.8	3	183	Hl.		18 53 1.0	14 50 23.8	3	160b	Wl.	e 15.
22	π Capricorni	RD	19 24 48.5	15 22 6.1	3	183	Hl.	1 2.	19 24 48.4	15 22 6.0	3	160b	Wl.	1 2.
22	ρ Capricorni	DB	19 35 23.3	15 32 39.1	4	183	Hl.		19 35 22.5	15 32 38.3	3	160b	Wl.	±5.
22	Bradley 2627	DB	-- -- ----	-- -- ----	--	---			19 37 18.7	15 34 34.1	3	160b	Wl.	±4.
June 14	γ Libræ	DD	14 6 49.2	8 34 32.8	3	183	Hl.		-- -- ----	-- -- ----	--	---		
14	γ Libræ	RB	15 20 29.5	9 48 1.1	3	183	Hl.	1 10.	-- -- ----	-- -- ----	--	---		
14	η Libræ	DD	19 14 10.1	13 41 3.4	4	183	Hl.		-- -- ----	-- -- ----	--	---		
17	29 Sagittarii	DB	15 40 16.1	9 55 56.7	4	183	Hl.	ch.	-- -- ----	-- -- ----	--	---		
17	29 Sagittarii	RD	16 47 58.9	11 3 28.5	4	183	Hl.	1 2 h.	-- -- ----	-- -- ----	--	---		
July 9	65 Virginis	DD	16 30 39.0	9 19 41.3	3	183	Hl.	k.	16 30 38.9	9 19 41.2	3	115	B.	1 1 k.
9	65 Virginis	RB	17 38 29.7	10 27 21.0	3	183	Hl.	1 20.	17 38 28.8	10 27 20.0	4	160b	B.	1 40±20.
9	66 Virginis	DD	17 19 38.3	10 8 32.6	3	183	Hl.	k.	17 19 38.4	10 8 32.7	3	115	B.	1 2.
9	B. D.−4° 3473	DD	-- -- ----	-- -- ----	--	---			17 18 27.5	10 7 22.0	3	115	B.	1 1.
16	π Capricorni	DB	17 45 10.3	10 6 29.1	4	183	Hl.	c.	-- -- ----	-- -- ----	--	----		
19	χ Aquarii	DB	18 8 58.8	10 18 25.9	4	183	Hl.	e 10.	-- -- ----	-- -- ----	-	----		
19	χ Aquarii	RD	19 14 29.3	11 23 45.7	3	183	Hl.	1 5.	19 14 29.4	11 23 45.8	3	85	B.	1 2.
24	8 B. Tauri	DB	22 42 59.1	14 32 1.8	3	183	Hl.		22 42 58.0	14 32 0.7	4	160b	B.	1 5±10.
24	8 B. Tauri	RD	23 52 40.5	15 41 31.8	3	183	Hl.	1 2 k.	23 52 40.6	15 41 31.8	3	115	B.	1 1½ k.
Sept. 10	44 Capricorni	DD	0 47 13.8	13 27 12.5	4	183	Hl.	1 1 c.	0 47 13.8	13 27 12.6	4	118	B.	1 2.
17	*f* Tauri	DB	21 37 1.8	9 50 0.4	4	183	Hl.	h.	-- -- ----	-- -- ----	-	----		
17	*f* Tauri	RD	22 38 5.3	10 50 53.9	3	183	Hl.	1 1 h.	-- -- ----	-- -- ----	-	----		
Oct. 12	ν Piscium	DB	3 10 4.4	13 43 50.7	3	183	Hl.	e 10.	-- -- ----	-- -- ----	-	----		
12	ν Piscium	RD	3 59 48.7	14 33 26.9	3	183	Hl.	1 3.	-- -- ----	-- -- ----	-	----		
21	π Cancri	DB	6 33 46.3	16 31 36.1	4	178b	B.	e 10±10.	6 33 46.8	16 31 36.6	4	196	Wl.	e 20±10.
21	π Cancri	RD	7 20 23.1	17 18 5.3	4	183	B.	1 2.	7 20 23.1	17 18 5.3	3	196	Wl.	1 1.
22	α Leonis	DB	7 42 58.7	17 36 41.2	3	178b	B.	1 1.	7 42 58.8	17 36 41.4	3	115	Wl.	1 2±1.
22	α Leonis	RD	9 4 53.2	18 58 22.3	3	183	B.	1 2.	9 4 53.3	18 58 22.4	3	115	Wl.	1 2±1.
31	16 G. Sagittarii	DD	20 53 5.6	6 13 11.4	3	183	B.	1 1 c.	20 53 6.7	6 13 12.6	4	37	Wl.	1 15±5 c.
Nov. 7	14 Ceti	DD	2 17 38.4	11 9 19.8	3	183	Hl.	i.	2 17 38.7	11 9 20.1	3	115	B.	1 1.
7	14 Ceti	RB	3 20 46.2	12 12 17.2	3	183	Hl.	1 10 i.	3 20 44.4	12 12 15.4	4	160b	B.	1 30±10.
12	264 B. Tauri	DB	22 11 2.7	6 43 44.9	4	183	Hl.		-- -- ----	-- -- ----	-	----		
12	264 B. Tauri	RD	22 38 12.4	7 10 50.2	3	183	Hl.	1 20.	-- -- ----	-- -- ----	-	----		
14	71 Orionis	DB	0 32 59.7	8 57 26.8	4	183	Hl.		0 32 59.6	8 57 26.8	4	160b	B.	±10.
14	71 Orionis	RD	-- -- ----	-- -- ----	-	-- -			1 19 33.6	9 43 53.1	3	160b	B.	1 2.
Dec. 1	45 Capricorni	DD	0 28 46.5	7 46 23.8	4	183	Hl.	k.	0 28 46.6	7 46 23.9	4	115	B.	1 1.
1	45 Capricorni	RB	1 36 28.6	8 53 54.8	5	183	Hl.	130.	-- -- ----	-- -- ----	-	----		
22	γ Libræ	DB	11 41 15.3	17 34 28.3	3	183	Hl.	h.	11 41 15.8	17 34 28.8	4	85	B.	1 4±2.
22	γ Libræ	RD	12 38 11.5	18 31 15.2	3	183	Hl.	1 1 k.	12 38 11.6	18 31 15.4	2	85	B.	1 2.
29	42 Aquarii	DD	0 57 32.1	6 24 59.2	3	183	Hl.	1 1 c.	0 57 32.2	6 24 59.4	3	85	B.	1 1 h.
1925														
Feb. 6	10 H. Cancri	DD	6 37 23.6	9 30 34.5	2	183	Hl.		6 37 23.7	9 30 34.7	3	160b	B.	1 1½.
6	10 H. Cancri	RB	-- -- ----	-- -- ----	-	----			7 17 59.6	10 11 3.9	3	160b	B.	1 40±20.
8	ψ Leonis	DB	5 29 50.0	8 15 20.2	3	183	Hl.	C.	5 29 49.5	8 15 19.7	4	160b	B.	±2.
8	ψ Leonis	RB	6 29 47.5	9 15 7.9	3	183	Hl.	1 10 C.	6 29 49.6	9 15 10.0	3	160b	B.	1 10±5 D.
27	μ Ceti	DD	6 47 24.5	8 17 59.7	4	183	Hl.	k.	6 47 24.6	8 17 59.8	4	115	B.	1 1.
27	μ Ceti	RB	7 54 16.4	9 24 40.7	4	183	Hl.	1 20.	7 54 15.1	9 24 39.4	5	160b	B.	1 20±10.
Mar. 7	7 Leonis	DD	13 15 58.5	14 14 2.8	3	183	Hl.	1 2 h.	13 15 58.6	14 14 2.9	3	85	B.	1 2 h.
7	11 Leonis	DD	14 33 32.8	15 31 24.4	2	183	Hl.	1 1 h.	14 33 33.0	15 31 24.6	4	85	B.	1 1 f h.
12	88 Virginis	DB	15 29 19.7	16 7 22.6	3	183	Hl.	e h c.	-- -- ----	-- -- ----	-	----		
12	88 Virginis	RD	16 35 26.9	17 13 19.0	3	183	Hl.	1 2 c.	-- -- ----	-- -- ----	-	----		
14	γ Libræ	DB	15 6 12.6	15 36 27.6	4	183	Hl.	c.	-- -- ----	-- -- ----	-	----		
Apr. 13	μ Sagittarii	DB	15 10 40.6	13 42 57.6	4	183	Hl.	c.	15 10 40.9	13 42 57.9	4	160b	Bn.	g.
May 1	ψ Leonis	RB	14 31 9.2	11 52 46.3	4	178b	Bn.		-- -- ----	-- -- ----	-	----		
8	η Libræ	DB	12 52 36.0	9 46 57.9	3	183	Hl.	c.	-- -- ----	-- -- ----	-	----		
July 1	13 Libræ	DD	16 45 49.8	10 7 14.3	2	183	Hl.	1 1 h.	16 45 49.9	10 7 14.5	3	235	Bn.	h.
1	13 Libræ	RB	17 38 46.5	11 0 2.4	2	183	Hl.	1 20 h.	17 38 48.2	11 0 4.1	3	160b	Bn.	1 h.
Aug. 15	61 Geminorum	DB	1 34 24.8	15 57 26.8	3	183	Hl.		-- -- ----	-- -- ----	-	----		
15	61 Geminorum	RD	2 12 54.5	16 35 50.2	3	183	Hl.	1 2 t k.	-- -- ----	-- -- ----	-	----		

A. Saw 1^s earlier than given time. B. Saw ½^s earlier than given time.
C. Foggy. D. Saw 0^s.3 earlier than given time.

Date	Object	Ph.	26-inch W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.	12-inch W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.
1925			h m s	h m s					h m s	h m s				
Aug. 29	o Sagittarii	DD	18 23 26.2	7 52 36.1	3	183	Hl.	1 2.	18 23 26.2	7 52 36.1	3	235	Bn.	
29	o Sagittarii	RB	19 40 39.9	9 9 37.1	3	183	Hl.	1 20.	19 40 41.1	9 9 38.3	3	160b	Bn.	
29	199 B. Sagittarii	DD	-- -- ----	-- -- ----	-	---			22 43 53.1	12 12 20.3	3	235	Bn.	
Sept. 1	39 Aquarii	DD	19 4 22.6	8 21 38.0	3	183	Hl.		19 4 22.7	8 21 38.1	3	235	Bn.	
1	39 Aquarii	RB	20 4 32.4	9 21 38.0	3	183	Hl.	1 20.	-- -- ----	-- -- ----	-	---		
28	δ Capricorni	DD	19 35 56.1	7 6 56.9	3	183	Hl.		19 35 56.0	7 6 56.8	2	115	Bn.	
28	δ Capricorni	RB	20 53 52.6	8 24 40.6	3	183	Hl.	1 10.	20 53 52.1	8 24 40.1	3	235	Bn.	
Oct. 7	χ^1 Orionis	DB	0 20 3.9	11 14 55.0	3	183	Hl.	c.	0 20 5.1	11 14 56.1	3	160b	Bn.	c g.
7	χ^1 Orionis	RD	0 46 9.3	11 40 56.1	3	183	Hl.	1 2 c.	0 46 8.8	11 40 55.6	3	115	Bn.	c.
9	79 Geminorum	DB	-- -- ----	-- -- ----	-	---			4 23 56.8	15 10 16.1	4	160b	Bn.	g c u.
9	79 Geminorum	RD	5 41 17.3	16 27 24.0	3	183	Hl.	k.	5 41 17.4	16 27 24.1	3	235	Bn.	k.
27	ψ^2 Aquarii	DD	19 13 48.1	4 50 51.3	3	183	Hl.	s c.	19 13 48.2	4 50 51.3	4	115	Bn.	g.
27	ψ^2 Aquarii	RB	20 6 59.7	5 43 54.1	3	183	Hl.	1 20.	20 6 56.8	5 43 51.2	3	235	Bn.	
Nov. 4	15 Geminorum	DB	-- -- ----	-- -- ----	-	---			1 49 27.3	10 53 58.4	3	160b	Bn.	g h.
21	30 Capricorni	DD	-- -- ----	-- -- ----	-	---			0 21 26.6	8 19 21.6	3	115	Bn.	k.
1926														
Jan. 1	12 B. Leonis	DB	11 42 8.3	16 56 59.4	3	183	Hl.		-- -- ----	-- -- ----		---		
1	12 B. Leonis	RD	12 49 39.8	18 4 19.8	3	183	Hl.	1 5.	12 49 39.6	18 4 19.6	3	115	Bn.	
Feb. 20	353 B. Tauri	DD	7 29 13.0	9 28 10.0	4	183	Hl.	k.	7 29 13.1	9 28 10.1	4	115	Bn.	
20	353 B. Tauri	RB	8 50 33.3	10 49 17.0	4	183	Hl.	1 20.	8 50 31.5	10 49 15.2	5	235	Bn.	v f.
Mar. 2	80 Virginis	DB	-- -- ----	-- -- ----	-	---			14 19 1.8	15 37 32.7	4	160b	Bn.	g h w.
2	80 Virginis	RD	15 5 43.8	16 24 7.0	3	183	Hl.	1 1.	15 5 44.0	16 24 7.2	3	115	Bn.	
24	12 B. Leonis	DD	12 40 0.8	12 32 18.0	3	183	Hl.	1 1.	12 40 0.8	12 32 17.9	3	115	Bn.	
24	12 B. Leonis	RB	13 27 57.3	13 20 6.5	4	183	Hl.	1 10.	13 27 56.3	13 20 5.6	4	235	Bn.	
Apr. 26	566 B. Virginis	DB	-- -- ----	-- -- ----	-	---			9 27 6.7	7 10 10.5	4	160b	Bn.	g u A.
26	566 B. Virginis	RB	-- -- ----	-- -- ----	-	---			9 42 58.5	7 25 59.7	5	235	Bn.	
30	ξ Ophiuchi	DB	-- -- ----	-- -- ----	-	---			13 40 12.2	11 6 50.9	5	160b	Bn.	g u.
30	ξ Ophiuchi	RD	14 11 32.7	11 38 6.2	4	183	Hl.	1 1 b.	14 11 32.5	11 38 6.1	4	235	Bn.	c.
May 28	21 G. Sagittarii	DB	15 28 15.3	11 4 30.8	5	183	Hl.	e.	15 28 13.7	11 4 29.2	4	160b	Bn.	g.
28	21 G. Sagittarii	RD	16 39 58.0	12 16 1.7	3	183	Hl.	1 1.	16 39 58.1	12 16 1.8	3	235	Bn.	
29	191 B. Sagittarii	DB	-- -- ----	-- -- ----	-	---			18 15 23.1	13 47 15.3	4	160b	Bn.	g h.
29	191 B. Sagittarii	RD	19 38 5.9	15 9 44.6	3	183	Hl.	1 1.	19 38 6.1	15 9 44.7	4	235	Bn.	
June 3	30 Piscium	DB	20 20 51.2	15 32 43.3	3	183	Hl.		20 20 51.8	15 32 43.9	3	160b	Bn.	g.
3	30 Piscium	RD	21 32 30.4	16 44 10.7	3	183	Hl.	1 2.	-- -- ----	-- -- ----	-	---		
24	52 Ophiuchi	DD	15 50 25.6	9 40 27.9	4	183	Hl.	1 1.	15 50 25.8	9 40 28.1	4	235	Bn.	f.
24	52 Ophiuchi	RB	-- -- ----	-- -- ----	-	---			17 10 16.6	11 0 5.8	5	235	Bn.	
Aug. 2	302 B. Tauri	DB	22 46 27.2	14 2 0.8	4	183	Hl.	c.	-- -- ----	-- -- ----	-	---		
2	302 B. Tauri	RD	23 43 38.7	14 59 2.9	3	183	Hl.	1 1 k.	-- -- ----	-- -- ----	-	---		
Sept. 20	336 B. Aquarii	DD	0 2 52.4	12 5 34.0	3	183	Hl.	u c.	0 2 56.5	12 5 38.1	4	160b	Bn.	g u c.
26	333 B. Tauri	DB	0 29 32.9	12 8 34.7	4	183	Hl.		0 29 39.4	12 8 41.2	4	160b	Bn.	g.
26	333 B. Tauri	RD	1 3 35.0	12 42 31.3	3	183	Hl.	1 1.	1 3 35.0	12 42 31.3	3	115	Bn.	
26	*l* Tauri	DB	1 53 19.8	13 32 7.9	3	183	Hl.		1 53 21.6	13 32 9.7	3	160b	Bn.	g.
26	*l* Tauri	RD	2 48 30.6	14 27 9.7	3	183	Hl.	1 2 c.	2 48 30.8	14 27 9.8	4	115	Bn.	c.
Oct. 14	329 B. Sagittarii	DD	22 25 45.8	8 54 21.6	4	183	Hl.	k.	-- -- ----	-- -- ----	-	---		
21	85 Ceti	DB	23 11 7.1	9 12 4.0	3	367	Bn.	g.	-- -- ----	-- -- ----	-	---		
21	85 Ceti	RD	23 47 32.7	9 48 23.7	3	367	Bn.		-- -- ----	-- -- ----	-	---		
Nov. 20	*l* Tauri	DB	0 24 44.9	8 27 32.5	4	183	Hl.	c.	0 24 47.6	8 27 35.2	3	160b	Bn.	g.
Dec. 11	290 B. Aquarii	DD	22 22 3.9	5 2 37.4	4	183	Bn.		-- -- ----	-- -- ----	-	---		

OCCULTATION BY VENUS

Date	Object	Ph.	26-inch W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.	12-inch W. Sid. T.	W. M. T.	Seeing	Power	Obsr.	Rem.
1920 Jan. 4	B. D.−17°4478 (8.0)	RD	-- -- ----	-- -- ----	-	------	------	----------	13 16 48.8	18 21 43.9	4	115	B.	B.

A. Apparently both phenomena at bright limb.
B. Certainly late 10s. Possibly late ½m to 1½m or more. Could not see star near limb at DB.

OBSERVATIONS OF SOLAR ECLIPSES

AND

TRANSIT OF MERCURY

Throughout Part I of this volume the astronomical dates
are used as employed before 1925.

Date	First Contact		Last Contact		Inst.	Aperture used	Power	Observer	Remarks
	W. M. T.	Seeing	W. M. T.	Seeing					
1908	h m s		h m s		in.	in.			
June 27	21 27 11. 6	2	24 40 47. 3	4	26	12	---	Hd.	Herschel solar eyepiece. Time of last contact somewhat uncertain.
27	21 27 13. 3	-	24 40 43. 7	-	5	1	30	Frederick.	Finder of 26-inch. Last contact, ±4.^{s}
27	21 27 12. 3	2	24 40 47. 2	-	12	4	120	Fn.	Polarizing eyepiece.
27	21 27 12. 8	2	24 40 43. 7	3	5	5	---	Hill.	From roof of main building.
27	21 27 12. 8	-	24 40 42. 2	-	5	5	---	Littell.	From roof of main building.
1914									
Aug. 20	17 32 34. 5	5	17 43 2. 8	4	12	12	---	Ws.	Polarizing eyepiece.
20	17 32 43	-	17 43 33	-	5	5	---	Hoogewerff.	From porch of superintendent's residence.
20	17 32 54	-	17 43 52	-	5	5	---	Hl.	From roof of main building.
1916									
Feb. 2	22 2 57. 3	4	24 14 23. 2	4	12	12	---	Bn.	Polarizing eyepiece. Times uncertain, last 5^s perhaps.
2	22 2 42	-	24 14 24	-	5	5	---	Hoogewerff.	From porch of superintendent's residence.
2	22 3 30	-	24 14 1	-	5	5	---	Smith.	From roof of main building.
2	22 3 2	-	24 14 3	-	5	5	---	Hl.	From roof of main building.
2	22 3 9	-	24 14 18	-	5	5	---	Hill.	From roof of main building.
1918									
June 8	5 24 7. 9	3	-- -- ----	-	12	12	---	Bn.	Polarizing eyepiece.
8	5 24 10	-	-- -- ----	-	5	5	---	Hl.	From roof of main building.
1920									
Nov. 9	20 52 6	4	23 0 49	4	12	12	---	Hl.	Polarizing eyepiece.
9	20 52 4	4	23 0 43	4	5	5	---	Hd.	From roof of main building. Several seconds late on first contact; last, uncertain. Strong wind interfered.
9	20 52 3	5	23 0 40	5	5	5	---	Hill.	From roof of main building. Very windy.
9	-- -- ----	4	23 0 53	4	5	5	---	Bn.	From roof of main building. Very windy. Last contact, ±5^s.
9	-- -- ----	4	23 0 51	4	5	5	---	B.	From roof of main building. Very windy.
1923									
Sept. 10	3 32 49. 9	4	5 24 15. 4	4	12	12	---	B.	Polarizing eyepiece. First contact, late 8^s. Last contact, uncertain 3^s.
10	3 32 49	-	5 24 15	4	5	5	---	Hd.	First contact, a few seconds late.
10	3 32 52	-	5 24 5	-	5	5	---	Hill.	
10	3 32 47	2	5 24 18	4	5	5	---	Bn.	Last contact, perhaps a little late.
1925									
Jan. 23	-- -- ----	-	22 13 36. 4	-	12	12	---	Hl.	Polarizing eyepiece.
23	19 46 45	4	22 13 25	4	5	5	---	Hd.	
23	19 47 1	-	22 13 38	-	5	5	---	Hill.	First contact, possibly saw 10^s earlier. Limb v. unsteady. Last contact, limb much better than for first contact.
23	19 46 50	5	22 13 30	3	5	5	---	B.	First contact, estimated 8^s late; certainly 5^s late.
23	-- -- ----	-	22 13 33	4	5	5	---	Sollenberger.	
23	-- -- ----	-	22 13 31	1	5	5	---	Whittaker.	Last 5 observations from roof of main building.

OBSERVATIONS OF TRANSIT OF MERCURY

Date	W. M. T.		Seeing	Inst.	Observer	Remarks
	Third Contact	Fourth Contact				
1914	h m s	h m s		in.		
Nov. 6	20 59 14. 2	21 1 15. 3	2	12	Bn.	Third contact, doubtful. Fourth contact, perhaps a little early. Used polarizing eyepiece. Obsns. recorded on chronograph.
6	20 59 5. 7	21 1 11. 7	-	5	Hill.	
6	20 59 34. 7	21 1 11. 7	-	5	Hoogewerff.	

OBSERVATIONS OF ECLIPSES OF SATELLITES

Throughout Part I of this volume the astronomical dates are used as employed before 1925

ECLIPSE OF SATELLITE I, OF JUPITER

Date	W. M. T.	Phen.	Seeing	Inst.	Power	Obsr.	Remarks
1921	h m s			in.			
Jan. 16	18 7 23	D	5	26	183	Hl.	Late $0^s.5$. Windy.
18	12 35 32	D	3	26	183	Hl.	Uncertain. Clds.
18	12 35 28	D	3	12	85	B.	Late $1^s \pm \frac{1}{2}^s$. Clds.
Feb. 24	16 31 0	D	3	26	183	Hl.	Disappearance close to limb of planet.
Mar. 23	7 51 36	R	4	26	183	Hl.	Late, perhaps 2^s. Probably haze. Clouded immediately.
23	7 51 25	R	4	12	85	B.	Late $3^s \pm 1^s$. Clds. Haze.
28	15 17 13	R	4	26	183	Hl.	Eye and ear. Windy. Clds.
28	15 17 25	R	5	12	---	B.	Late $5^s \pm 2^s$. Haze.
Apr. 6	11 40 24	R	2	26	183	Hl.	Haze.
May 8	8 17 15	R	3	26	183	Hl.	Late 1^s.
1922							
Jan. 5	17 20 30	D	3	26	183	Hl.	Clds. Haze.
14	13 41 49	D	5	26	183	Hl.	Early.
14	13 41 40	D	5	12	115	B.	Probably visible 4^s later.
30	11 55 50	D	5	26	183	Hl.	
30	11 55 38	D	5	12	85	B.	Late 3^s. Considerable haze.
Feb. 22	12 2 45	D	5	26	183	Hl.	
Mar. 8	15 49 5	D	3	26	183	Hl.	
8	15 49 12	D	3	12	115	B.	Late $3^s \pm 1^s$. Haze.
Apr. 18	10 50 48	R	3	26	183	Hl.	Late.
18	10 50 49	R	4	12	85	B.	Considerable haze. Observation worthless.
May 11	11 1 51	R	4	26	183	Hl.	Late. Clds. Haze.
June 3	11 14 14	R	3	26	183	Hl.	Saw momentarily 2^s before given time, then went out.
1924							
Apr. 23	14 33 49	D	3	26	183	Hl.	
23	14 33 52	D	4	12	85	B.	Late 2^s.
June 26	9 45 51	R	4	26	183	Hl.	Late. Haze.
July 26	11 52 31	R	5	12	115	B.	Late 4^s.
1926							
Aug. 28	7 26 11	R	5	26	183	Hl.	
Oct. 4	11 30 1	R	3	26	---	Hl.	Late. Eyepiece fogged.
4	11 29 59	R	3	12	162	Bn.	Late $10^s \pm$.
20	9 49 24	R	4	26	183	Hl.	Moonlight. Haze.
20	9 49 24	R	4	12	162	Bn.	

ECLIPSE OF SATELLITE II, OF JUPITER

Date	W. M. T.	Phen.	Seeing	Inst.	Power	Obsr.	Remarks
1921							
Jan. 18	15 58 11	D	3	26	183	Hl.	
18	15 57 52	D	3	12	85	B.	Late 1^s. Perhaps still visible $8^s \pm$ later.
Feb. 12	13 3 19	D	4	26	183	Hl.	Perhaps early 2^s.
12	13 3 16	D	4	12	85	B.	Late 1^s. Suspected still visible 8^s later.
Mar. 27	7 24 37	R	4	26	183	Hl.	Late. Haze.
1922							
Jan. 12	14 22 10	D	5	26	183	Hl.	Eyepiece fogged.
12	14 22 14	D	4	12	115	B.	Late 2^s. Some haze.
1924							
Apr. 12	12 59 58	D	4	26	183	Hl.	Early 1^s.
July 3	9 14 24	R	3	26	183	Hl.	Haze. Clouded shortly after this.
10	11 51 53	R	3	26	183	Hl.	Late. Haze.
10	11 52 10	R	3	12	85	B.	Late $15^s \pm 5^s$. Considerable haze.
1926							
July 12	12 42 39	D	4	26	183	Hl.	
12	12 42 46	D	3	12	196	Bn.	Uncertain. Perhaps a little haze.
Aug. 6	9 44 55	D	4	26	183	Hl.	Haze.

ECLIPSE OF DIONE, SATELLITE OF SATURN

Date	W. M. T.	Phen.	Seeing	Inst.	Power	Obsr.	Remarks
1908							
Aug. 3	14 25 42	D		26	375	Hl.	

OBSERVATIONS OF DOUBLE STARS

ANONYMOUS. $\alpha=2^h\ 24^m.0$, $\delta=+15°\ 10'$ (1900)

Date	p	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
	°	″			in.			
1908. 875	194. 02	4. 36	3, 6		26	388.	Hd.	Power 252 used in s. Each component 12^m.

B. D.+46°1356. $\alpha=8^h\ 0^m.9$, $\delta=+46°\ 29'$ (1900)

Date	p	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1914. 304	156. 59	6. 49	4, 4		26	388, Brt.	Ws.	Each component 10^m. s. f. component possibly slightly fainter.

70 OPHIUCHI (4.1, 6.1). $\alpha=18^h\ 0^m.4$, $\delta=+2°\ 31'$ (1900)

A and B

Date	p	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1918. 748	138. 55	5. 02	4, 4	4	26	367, Red.	Hl.	
772	137. 96	5. 13	4, 4	4	26	367, Red.	Hl.	
1919. 500	134. 69	5. 49	4, 4	4	26	495, Brt.	B.	
577	135. 23	5. 43	4, 4	4	26	388, Brt.	B.	
610	134. 80	5. 37	4, 4	4	26	388, Brt.	B.	Moonlight and haze. First half of s with black wires.
1924. 592	127. 46	6. 14	4, 4	3	26	495, Blk.	B.	
614	129. 39	6. 16	4, 4	4	26	495, Blk.	B.	
623	129. 74	6. 37	4, 4	3	26	495, Blk.	B.	
642	128. 73	6. 16	4, 4	2	26	495, Blk.	B.	
664	129. 44	6. 12	4, 4	3	26	367, Blk.	B.	

A and a

Date	p	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1918. 753	228. 26	38. 13	4, 4	3	26	367, Red.	Hl.	
1919. 495	228. 76	37. 84	4, 4	4	26	388, Red.	B.	
577	228. 74	37. 47	4, 4	4	26	388, Red.	B.	
744	229. 07	37. 08	4, 4	3	26	495, Red.	B.	
1924. 614	236. 37	34. 74	4, 4	3	26	367, Red.	B.	
623	236. 34	34. 70	4, 4	2	26	495, Red.	B.	
631	236. 53	34. 86	4, 4	3	26	367, Red.	B.	
653	236. 62	34. 69	4, 4	3	26	367, Red.	B.	

A and b

Date	p	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1919. 495	263. 23	69. 18	4, 4	4	26	388, Red.	B.	
577	263. 26	68. 72	4, 4	4	26	388, Red.	B.	
744	262. 76	68. 00	4, 4	2	26	388, Red.	B.	
1924. 634	267. 12	68. 47	4, 5	3	26	367, Red.	B.	
653	267. 49	68. 57	5, 4	3	26	367, Red.	B.	
664	267. 43	68. 58	4, 4	3	26	367, Red.	B.	
751	267. 41	69. 11	5, 5	2	26	367, Red.	B.	

A and c

Date	p	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1918. 758	65. 10	107. 24	4, 4	4	26	367, Red.	Hl.	
1919. 500	64. 95	108. 02	4, 4	3	26	495, Red.	B.	
632	64. 77	108. 42	4, 4	3	26	388, Red.	B.	
1924. 603	62. 42	109. 78	4, 4	3	26	367, Red.	B.	
623	62. 12	109. 74	4, 4	3	26	367, Red.	B.	
642	62. 02	109. 70	4, 4	2	26	367, Red.	B.	
664	62. 05	110. 08	4, 4	3	26	367, Red.	B.	

A and d

Date	p	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
	°	″			in.			
1918. 767	30. 76	115. 98	4, 4	4	26	367, Red.	Hl.	
1919. 500	30. 68	116. 41	4, 4	4	26	495, Red.	B.	
632	30. 60	116. 65	4, 4	4	26	388, Red.	B.	
681	30. 78	116. 67	4, 4	4	26	388, Red.	B.	Moonlight.
1924. 584	28. 86	121. 03	4, 4	3	26	495, Red.	B.	
603	29. 14	120. 83	4, 4	3	26	367, Red.	B.	
634	29. 17	120. 66	4, 4	3	26	367, Red.	B.	
688	29. 13	121. 15	4, 4	3	26	367, Red.	B.	

A and e

Date	p	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1918. 753	95. 98	115. 91	4, 4	3	26	367, Red.	Hl.	
1919. 500	96. 13	116. 02	4, 5	3	26	495, Red.	B.	
681	95. 96	115. 92	4, 4	4	26	388, Red.	B.	Moonlight.
1924. 584	93. 20	114. 43	4, 4	3	26	495, Red.	B.	
631	93. 13	114. 61	4, 4	3	26	367, Red.	B.	
653	93. 12	114. 50	4, 4	2	26	367, Red.	B.	
688	93. 18	114. 72	4, 5	4	26	367, Red.	B.	

A and f

Date	p	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1919. 495	330. 85	155. 72	4, 4	4	26	388, Red.	B.	
632	330. 81	156. 84	4, 4	3	26	388, Red.	B.	
719	331. 09	156. 58	4, 4	4	26	388, Red.	B.	Clouds. Star f ft
1924. 603	331. 53	161. 24	4, 4	3	26	367, Red.	B.	
623	331. 48	161. 00	4, 4	3	26	367, Red.	B.	
754	331. 82	161. 75	4, 6	2	26	367, Red.	B.	
757	331. 64	161. 81	4, 5	2	26	367, Red.	B.	

A and g

Date	p	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1918. 769	234. 44	149. 74	4, 4	3	26	367, Red.	Hl.	
1919. 495	234. 47	148. 91	4, 4	4	26	388, Red.	B.	
681	234. 61	148. 64	4, 4	4	26	388, Red.	B.	Moonlight.
744	234. 66	148. 68	4, 4	3	26	388, Red.	B.	
1924. 603	236. 40	146. 33	4, 4	3	26	367, Red.	B.	
631	236. 41	146. 32	4, 4	3	26	367, Red.	B.	
653	236. 37	146. 44	4, 5	3	26	367, Red.	B.	
688	236. 49	146. 16	4, 4	3	26	367, Red.	B.	

A and Anonymous

Date	p	s	Comp.	Seeing	Inst.	Power and Illum.	Obsr.	Remarks
1924. 634	4. 52	158. 27	4, 5	3	26	367, Red.	B.	

OBSERVATIONS OF MISCELLANEOUS STARS NOVAE, AND NEBULAE

Throughout Part I of this volume the astronomical dates are used as employed before 1925

MISCELLANEOUS STARS

Date	W. M. T.	Object	Equinox	Mean Place α	Mean Place δ	Δα	Δδ	Comp.
	h m			h m s	° ′ ″	m s	′ ″	
Jan. 21, 1913	8 23	BD+6°94	1913.0	0 39 22.78	+ 7 4 43.3	−0 51.09	− 3 50.6	t12, 4
Jan. 22, 1913	8 19	BD+6°94	1913.0	0 39 22.77	+ 7 4 44.6	−4 47.27	− 1 57.9	t18, 6
Jan. 6, 1914	6 34	BD+2°100	1914.0	0 41 41.51	+ 3 17 48.1	+0 34.20	+ 1 43.1	t30, 10
Dec. 1, 1923	10 13	Step star 12^m	1923.0	1 40 51.27	+ 8 12 46.1	+0 12.33	+ 2 56.0	d8, 8
Feb. 16, 1924	7 14	Step star 12^m	1924.0	2 2 19.04	+ 3 45 49.5	+2 15.99	+ 2 2.1	t30, 6
Dec. 22, 1919	9 32	Step star 12^m	1919.0	2 32 37.85	+19 22 19.0	−1 26.28	− 0 21.4	t30, 6
July 28, 1909	15 26	BD+15°377	1909.0	2 38 42.73	+16 0 51.0	−8 6.04	− 6 35.0	t25, 5
Oct. 14, 1920	12 18	Step star $12\frac{1}{2}^m$	1920.0	2 46 14.29	−11 47 54.4	−0 17.07	+ 3 44.4	d10, 8
Feb. 13, 1918	9 59	Step star $12^m-12\frac{1}{2}^m$	1918.0	2 57 7.30	+19 25 5.6	+2 51.67	+10 10.2	t30, 6
Feb. 13, 1918	8 53	Step star 12^m	1918.0	2 57 54.19	+19 31 9.0	−0 34.32	+ 2 19.5	d10, 10
Nov. 22, 1921	8 59	Step star 11^m	1921.0	3 1 52.97	+85 25 48.8	−5 4.17	+ 3 20.1	d10, 10
Sept. 13, 1920	15 15	Step star 11^m	1920.0	3 1 54.93	− 7 51 33.0	+1 34.29	+ 3 13.8	t29, 6
Sept. 17, 1920	15 59	BD−8°587	1920.0	3 3 51.76	− 8 8 32.8	+0 10.43	− 7 10.2	d10, 8
Mar. 2, 1918	8 48	Step star 12^m	1918.0	3 17 53.50	+21 43 31.1	−1 54.75	− 1 31.7	t29, 6
Mar. 5, 1918	9 58	Step star $9^m.1$	1918.0	3 21 57.59	+22 3 30.7	+1 52.44	+ 4 10.8	t34, 7
Mar. 15, 1918	9 52	Step star $11\frac{1}{2}^m$	1918.0	3 35 21.71	+23 22 8.6	−1 10.45	+ 8 39.8	t35, 7
Mar. 6, 1925	7 43	BD+1°652	1925.0	3 39 19.82	+ 1 17 3.3	−2 2.15	+ 3 0.7	t35, 7
Mar. 6, 1925	7 43	BD+1°652	1925.0	3 39 19.74	+ 1 16 57.6	−2 52.83	+ 7 15.0	t35, 7
Aug. 24, 1925	15 5	Step star 11^m	1925.0	4 11 40.95	+ 2 52 41.4	+1 42.70	− 1 47.7	t25, 5
Aug. 24, 1925	15 5	Step star 11^m	1925.0	4 11 40.93	+ 2 52 42.2	+1 6.22	+ 3 2.0	t25, 5
Dec. 1, 1923	12 34	BD−9°857	1923.0	4 11 53.36	− 9 6 38.0	+1 10.83	− 3 50.6	t25, 5
Dec. 1, 1923	13 13	BD−6°921	1923.0	4 26 27.13	− 6 41 3.6	+3 32.17	− 6 24.5	t25, 5
Oct. 31, 1923	12 14	Step star	1923.0	4 43 48.66	+ 2 18 28.4	+2 29.74	−11 18.3	t28, 7
Dec. 26, 1918	16 59	Step star $9^m.8$	1918.0	6 58 26.53	+47 2 36.4	+0 32.28	− 7 33.9	d12, 10
Apr. 10, 1920	8 12	Step star	1920.0	7 34 27.19	+19 27 38.9	−1 17.02	− 5 0.7	t25, 5
Apr. 9, 1920	8 22	Step star 10^m	1920.0	7 46 49.64	+20 46 4.4	+0 6.07	− 4 15.0	d10, 8
Apr. 8, 1924	9 35	BD+38°1828	1924.0	7 47 27.35	+38 8 11.4	+0 45.66	+ 8 20.0	d10, 8
Nov. 29, 1921	10 52	BD+57°1122	1921.0	8 2 12.48	+57 13 38.9	+7 11.00	+ 3 50.4	t25, 5
Apr. 21, 1919	11 33	Step star $12\frac{1}{2}^m$	1919.0	8 58 13.99	+52 56 1.3	+2 58.65	− 3 45.7	t25, 5
Mar. 20, 1909	10 59	BD+19°2177	1909.0	9 8 27.24	+18 50 21.2	+2 16.91	− 5 46.1	t25, 5
May 25, 1921	10 40	BD+37°1986	1921.0	9 22 18.59	+37 36 13.4	+1 52.43	+ 0 22.1	t30, 6
June 23, 1922	8 43	BD+34°1995	1922.0	9 23 9.99	+34 34 2.0	−2 57.76	+ 0 45.9	t30, 6
Dec. 26, 1924	14 11	Step star $10\frac{1}{2}^m$	1924.0	10 47 45.34	+18 48 51.8	−3 39.98	− 8 13.3	t25, 5
Dec. 27, 1924	13 41	Step star $10\frac{1}{2}^m$	1924.0	10 47 55.33	+18 43 59.4	−3 57.83	+10 29.8	t25, 5
Dec. 18, 1911	16 35	BD+10°2253	1911.0	11 3 29.20	+ 9 50 51.8	+1 48.10	− 1 17.1	t10, 2
Apr. 24, 1907	11 24	AG Nicolajew 3219	1907.0	11 12 20.50	− 1 30 10.4	−3 18.80	−12 54.5	t15, 3
Apr. 24, 1907	10 47	BD−1°2505	1907.0	11 12 32.07	− 1 28 23.8	+0 11.65	+ 1 48.0	t15, 5
Apr. 24, 1907	11 4	BD−1°2505	1907.0	11 12 32.12	− 1 28 22.8	−3 7.18	−11 6.9	t15, 3
May 3, 1919	10 54	Step star	1919.0	11 19 6.28	− 4 51 18.6	+0 37.14	− 1 17.4	t30, 10
Dec. 18, 1911	16 47	BD+12°2383	1911.0	11 44 39.19	+12 5 2.4	+1 35.83	− 7 12.0	t9, 2
May 17, 1914	9 52	BD+2°2529	1914.0	12 14 6.52	+ 2 39 58.5	+4 34.11	− 4 22.7	t25, 5
Dec. 27, 1924	14 53	BD+3°2628	1924.0	12 15 15.06	+ 3 22 6.4	+0 49.00	− 9 17.8	t25, 5
Dec. 27, 1924	15 24	BD+2°2541	1924.0	12 23 6.61	+ 1 59 36.4	−0 56.94	+ 7 0.6	t25, 5
Dec. 27, 1924	15 24	BD+2°2541	1924.0	12 23 6.50	+ 1 59 37.3	−1 37.26	− 2 37.7	t25, 5
Sept. 18, 1919	8 33	Step star $12\frac{1}{2}^m$	1919.0	12 46 37.93	+58 20 51.3	−1 10.12	+10 32.5	t30, 6
Apr. 13, 1925	10 29	BD−20°3835	1925.0	13 25 50.22	−21 20 47.1	+1 38.26	− 0 7.9	t25, 5
Apr. 13, 1925	10 29	BD−20°3835	1925.0	13 25 50.36	−21 20 48.2	−1 23.09	− 3 31.7	t25, 5
Dec. 29, 1922	16 3	Step star $11^m\pm$	1922.0	13 44 50.31	+47 50 6.6	+6 9.50	+ 1 37.1	t28, 7
Apr. 18, 1923	14 59	BD−14°4071	1923.0	14 52 15.84	−15 10 27.6	−2 20.73	− 2 45.4	t28, 7
Oct. 2, 1919	7 27	Step star $12^m\pm$	1919.0	15 3 13.86	+12 48 3.0	−1 39.92	+ 0 10.2	t25, 5
Sept. 29, 1911	8 59	Step star	1911.0	15 6 48.97	+62 18 36.6	−3 16.60	+ 7 23.7	t15, 3
Apr. 18, 1914	14 47	BD−21°4418	1914.0	16 43 7.13	−21 15 42.9	+5 11.92	− 4 56.6	t25, 5
May 16, 1914	13 5	BD−21°4418	1914.0	16 43 7.16	−21 15 42.7	+5 11.96	− 4 56.3	t25, 5
May 16, 1914	13 6	BD−21°4421	1914.0	16 43 53.17	−21 13 36.2	+5 57.97	− 2 49.7	t25, 5
June 17, 1914	12 19	BD−21°4421	1914.0	16 43 53.16	−21 13 36.4	+5 57.98	− 2 49.9	t25, 5
Apr. 17, 1914	16 39	BD−21°4445	1914.0	16 49 58.29	−21 49 49.9	+0 28.19	− 5 27.6	t30, 10
May 21, 1914	13 59	CD−23°15270	1914.0	19 13 45.80	−23 0 22.0	+4 58.50	+ 4 22.0	t30, 6
June 29, 1914	11 31	CD−23°15270	1914.0	19 13 45.76	−23 0 21.2	+4 58.50	+ 4 22.1	t30, 6
May 20, 1914	14 19	BD−22°5054	1914.0	19 14 35.55	−22 48 0.3	+6 6.66	− 5 15.5	t25, 5
May 19, 1914	15 38	BD−22°5092	1914.0	19 19 25.67	−22 51 49.7	−2 47.21	− 4 26.7	t30, 6
Nov. 21, 1913	6 24	BD−18°5553	1913.0	19 54 2.22	−18 11 42.8	+2 15.97	−13 13.3	t25, 5

MISCELLANEOUS STARS

Mean Place of Comparison Star for Beginning of Year		Authority	Seeing	Inst.	Power	Obsr.	Remarks
α	δ						
h m s	° ′ ″			in.			
0 40 13. 86	+ 7 8 33. 8	AG Leipzig II 245	3	26	367p	Ws.	
0 44 10. 03	+ 7 6 42. 5	American Ephemeris 1913, δ Piscium	3	26	367p	Bn.	Brt. field.
0 41 7. 32	+ 3 16 5. 0	AG Albany 183	3	26	367	Ws.	Brt. field.
1 40 38. 94	+ 8 9 50. 1	Ast Tou +7°0140, 21	2	26	183	B.	
2 0 3. 06	+ 3 43 47. 3	AG Albany 586	2	26	183	B.	
2 34 4. 12	+19 22 40. 6	AG Berlin A 715	5	26	183	B.	
2 46 48. 82	+16 7 26. 1	AG Berlin A 771	2	12	115	Ep.	
2 46 31. 36	−11 51 38. 8	AG Harvard 648	4	26	183	B.	
2 54 15. 65	+19 14 55. 4	AG Berlin A 800	3	26	183	B.	V. poor obsn. Step star ft. for transits.
2 58 28. 51	+19 28 49. 5	AG Berlin A 817	3	26	183	B.	
3 6 57. 14	+85 22 28. 7	Gr Ast Vol III 734	3	26	183	B.	
3 0 20. 63	− 7 54 46. 9	Boss PGC 700	4	26	183	B.	V. poor obsn. Illumination of wires poor.
3 3 41. 33	− 8 1 22. 7	AG Wien-Ottakring 710	5	26	183	B.	
3 19 48. 24	+21 45 2. 8	AG Berlin B 1009	3	26	183	B.	Step star Ast Par +22°.0320, 99; +21°.0316, 48.
3 20 5. 16	+21 59 19. 9	AG Berlin B 1010	4	26	183	B.	Step star Ast Par +23°.0324, 88; +22°.0320, 59; +21°.0324, 22.
3 36 32. 15	+23 13 28. 9	AG Berlin B 1097	4	26	183	B.	Step star Ast Par +24°.0336, 156; +23°.0332, 63.
3 41 21. 96	+ 1 14 2. 6	AG Nicolaijew 800	4	26	183	B.	
3 42 12. 56	+ 1 9 42. 7	AG Nicolajew 804	4	26	183	B.	
4 9 58. 26	+ 2 54 29. 0	½ (Abbadia+4° à−2°, 2036+AG Albany 1230).	3	26	183	Bn.	
4 10 34. 70	+ 2 49 39. 9	½ (Abbadia+4°à−2°, 2043+AG Albany 1234).	3	26	183	Bn.	
4 10 42. 53	− 9 2 47. 5	AG Wien-Ottakring 1053	2	26	183	B.	
4 22 54. 96	− 6 34 39. 3	AG Wien-Ottakring 1110	3	26	183	B.	
4 41 18. 91	+ 2 29 46. 6	AG Albany 1396	4	26	183	B.	
6 57 54. 23	+47 10 10. 2	AG Bonn 5711	3	26	183	B.	
7 35 44. 20	+19 32 39. 6	AG Berlin A 2963	3	26	183	B.	Haze. Poor obsn.
7 46 43. 57	+20 50 19. 4	Ast Par +21°0748, 171	3	26	183	B.	Poor obsn.
7 46 41. 70	+37 59 51. 4	AG Lund 4003	3	26	183	Hl.	
7 55 1. 36	+57 9 47. 8	AG Hels 5324	4	26	183	B.	Clds. Ft. at times.
8 55 15. 35	+52 59 46. 9	AG Harvard 3270	3	26	183	B.	Poor transits. Trouble with key.
9 6 10. 34	+18 56 7. 3	Kuestner, 1885, No. 300	3	12	160	Ep.	
9 20 26. 17	+37 35 51. 3	AG Lund 4608	4	26	183	B.	
9 26 7. 74	+34 33 16. 0	½ (AG Leiden 3888+AG Lund 4647)	4	26	183	B.	
10 51 25. 35	+18 57 5. 1	Abbadia A 6171	3	26	183	B.	Poor transits.
10 51 53. 19	+18 33 29. 5	PGC Boss 2914	3	26	183	B.	Poor transits.
11 1 41. 09	+ 9 52 8. 8	AG Leipzig I 4192	--	26	---	Ep.	
11 15 39. 29	− 1 17 16. 0	AG Nicolajew 3228	3	12	160	R.	
11 12 20. 42	− 1 30 11. 7	AG Nicolajew 3219	2	12	160	R.	
11 15 39. 29	− 1 17 16. 0	AG Nicolajew 3228	2–3	12	160	R.	
11 18 29. 14	− 4 50 1. 2	AG Straszburg 4290	4	26	388	Bn.	
11 43 3. 35	+12 12 14. 4	AG Leipzig I 4401	--	26	---	Ep.	
12 9 32. 43	+ 2 44 21. 0	AG Albany 4451	2	26	183	Ws.	
12 14 26. 06	+ 3 31 24. 3	Abbadia B 7235	4	26	183	B.	
12 24 3. 55	+ 1 52 35. 7	AG Albany 4492	4	26	183	B.	
12 24 43. 77	+ 2 2 15. 0	Abbadia B 7295	4	26	183	B.	
12 47 48. 04	+58 10 18. 7	AG Hels 7337	4	26	183	B.	V. poor obsn.
13 24 11. 96	−21 20 39. 1	AG Obs. d'Alger 5734	5	26	183	Bn.	
13 27 13. 45	−21 17 16. 6	Ast Hyd −21°1324, 57681	5	26	183	Bn.	
13 38 40. 73	+47 48 30. 1	AG Bonn 9082	3	26	183	B.	
14 54 36. 57	−15 7 42. 3	AG Wash 5529	3	26	183	B.	
15 4 53. 78	+12 47 52. 6	AG Leipzig I 5315	4	26	183	B.	
15 10 5. 56	+62 11 12. 6	AG Hels 8270	--	26	---	Ep.	
16 37 55. 20	−21 10 46. 1	AG Algiers 6826	3	26	183	Bn.	Brt. field.
16 37 55. 20	−21 10 46. 1	AG Algiers 6826	3	26	183	Bn.	
16 37 55. 20	−21 10 46. 1	AG Algiers 6826	3	26	183	Bn.	
16 37 55. 20	−21 10 46. 1	AG Algiers 6826	3	26	183	Bn.	Brt. field.
16 49 30. 10	−21 44 22. 3	AG Algiers 6895	3	26	388	Bn.	Brt. field.
19 8 47. 30	−23 4 43. 6	Cordoba A 13375	4	26	183	Bn.	
19 8 47. 30	−23 4 43. 6	Cordoba A 13375	3	26	183	Bn.	Brt. field.
19 8 28. 87	−22 42 44. 3	Cordoba A 13370	4	26	183	Bn.	
19 22 12. 90	−22 47 23. 2	Cordoba A 13542	4	26	183	Bn.	
19 51 46. 27	−17 58 29. 3	AG Washington 7496	2	26	183	Ws.	Brt. field.

MISCELLANEOUS STARS

Date	W. M. T.	Object	Equinox	Mean Place α	Mean Place δ	Δα	Δδ	Comp.
	h m			h m s	° ′ ″	m s	′ ″	
Mar. 26, 1921	16 16	Step star 11±	1921. 0	20 19 33. 54	−13 46 19. 8	−0 9. 38	− 7 13. 6	d10, 8
Apr. 1, 1921	16 51	BD−11°5328	1921. 0	20 21 8. 60	−10 58 8. 0	+1 44. 36	− 2 32. 1	t25, 5
June 16, 1914	14 6	BD−20°6064	1914. 0	20 49 11. 29	−20 6 53. 0	+0 29. 98	− 1 22. 1	t30, 10
Jan. 17, 1923	7 45	BD+18°5080	1923. 0	22 55 14. 76	+19 18 1. 5	−3 18. 71	+ 1 42. 7	t24, 6

For the lunar eclipse of Nov. 26, 1909, Δα and Δδ were measured by Eppes on the 12-inch of the following stars: Dec. 30, 1910, star *a* referred to BD+20°709, $\Delta\alpha=-0^m\ 11^s.65$, $\Delta\delta=-6'\ 43''.8$. Jan. 4, 1911, star *b* referred to BD+20°713, $\Delta\alpha=-0^m\ 27^s.35$, $\Delta\delta=+3'\ 58''.9$. Dec. 30, 1910, star *c* referred to BD+20°713, $\Delta\alpha=+1^m\ 30^s.97$, $\Delta\delta=5'\ 55''.2$.

NOVÆ

Date	W. M. T.	Novæ	Equinox	Mean Place α	Mean Place δ	Δα	Δδ	Comp.
	h m			h m s	° ′ ″	m s	′ ″	
Mar. 16, 1912	9 35	II Geminorum	1912. 0	6 49 11. 76	+32 15 5. 3	−2 11. 26	− 9 13. 0	t25, 5
Mar. 26, 1912	8 51	II Geminorum	1912. 0	6 49 11. 58	+32 15 5. 3	−2 11. 45	− 9 13. 0	t25, 5

NOTES.—Mar. 13.4, 1912, Ws. Est. mag. 4.5. Nova pale yellow. Mar. 16.4 Ws. Comparisons made with 4-inch finder of 12-inch equatorial: Nova slightly brighter than BD+32°1414 (5.8), BD+33°1433 (6.3), BD+34°1530 (6.0), BD+29°1441 (6.3). Apparently same brightness as BD+34°1524 (6.0). Color, pale yellow. Mar. 17.4, Ws. Nova seemed of same brightness as BD+33°1433 (6.3) but slightly brighter than BD+32°1414 (5.8), BD+34°1530 (6.0), BD+29°1441 (6.3), and BD+34°1524 (6.0). Still tinged with yellow. Comparisons made with finder. Mar. 22.3, Ws. Nova pale yellow. Apparently somewhat fainter. Comparisons made with finder of 12-inch equatorial: Slightly brighter than BD+32°1414 (5.8) and more nearly white. Slightly brighter than BD+33°1433 (6.3). BD+32°1414 and BD+33°1433 seem to be of same color. Considerably brighter than BD+34°1524 (6.0) and BD+34°1530 (6.0). BD+34°1524 and BD+34°1530 seem to be equally bright and both are straw color. BD+34°1530 seems to be tinged with red. Nova brighter than BD+29°1524 (6.3). BD+29°1524 is more nearly white than Nova. Mar. 26.4, Ws. Nova fainter than all the stars mentioned under date of Mar. 22. Used finder of 12-inch equatorial. Nova yellowish. Sky hazy. Mar. 29.4, Ws. Comparison with finder of 12-inch equatorial. Nova slightly fainter. A trifle brighter than BD+34°1 (6537.0). Considerably fainter than BD+35°1511 (6.5). Clouds and haze.

Oct. 5, 1910	7 13	II Sagittarii	1910. 0	17 54 25. 49	−27 32 51. 7	−0 7. 33	+ 3 22. 8	d4, 4
June 9, 1918	10 34	III Aquilæ	1918. 0	18 44 43. 43	+ 0 29 31. 0	+0 13. 74	+ 3 37. 8	d4, 4
June 11, 1918	10 6	III Aquilæ	1918. 0	18 44 43. 48	+ 0 29 31. 4	+0 13. 75	+ 3 38. 0	d4, 4

NOTES.—June 12.5, 1918, Hl. Nova Aquilæ appears to be a trifle brighter than Altair. June 12.5, 1918, Bn. Nova Aquilæ appears to be about as bright as Altair but not quite so blue.

Sept. 4, 1920	10 15	III Cygni	1920. 0	19 56 24. 76	+53 24 0. 8	−0 46. 65	+ 3 46. 5	d10, 8

NOTES.—Aug. 25.3, 1920, Hl. Nova Cygni approximately 2.5 mag. Sept. 13.35 B. Mag. 5.4, Harvard scale, at $15^h.3$ G. M. T. with 2-inch binoculars. Sept. 16.3 B. $5^m.7$, Harvard scale, at $14^h.0$ G. M. T. with 2-inch binoculars. Sept. 18.3 B. $6^m.0$, Harvard scale, at $13^h.7$ G. M. T. with 2-inch binoculars. Oct. 2.3 B, with 2-inch binoculars, Nova Cygni at $13^h.7$ G. M. T.=BD+53°2308 (7.7)=BD+52°2613 (7.5). Oct. 11.3 B, with 5-inch finder, at $12^h.5$ G. M. T., Nova ⅛ from BD+53°2335 (8.7) to BD+53°2332 (8.5), including both components which are $8^m.4$ and $9^m.0$ as given in Burnham's catalogue; ¼ from BD+53°2335 (8.7) to BD+53°2330 (8.9). Very red. Oct. 14.3 B, with 5-inch finder, at $12^h.4$ G. M. T. Nova Cygni=BD+53°2332 (8.5), including both components; ½ from BD+53°2335 (8.7) to BD+53°2330 (8.9).

NOTE ON NOVA LACERTÆ.—Jan. 6.3, 1911, Eppes. Nova bright orange. Est. mag. 8.2.

NEBULÆ

Date	W. M. T.	Nebulæ	Equinox	Mean Place α	Mean Place δ	Δα	Δδ	Comp.
	h m			h m s	° ′ ″	m s	′ ″	
Feb. 29, 1916	14 4	NGC 2775	1916. 0	9 5 52. 54	+ 7 22 47. 8	+4 17. 11	−8 46. 2	t24, 5
Sept. 8, 1913	15 34		1913. 0	23 46 39. 15	+ 0 34 22. 8	+1 39. 03	−1 10. 2	t35, 7

MISCELLANEOUS STARS

Mean Place of Comparison Star for Beginning of Year		Authority	Seeing	Inst.	Power	Obsr.	Remarks
α	δ						
h m s	° ′ ″			in.			
20 19 42. 92	−13 39 6. 2	½ (AG Harvard 7195+AG Washington 7673).	5	26	183	B.	
20 19 24. 23	−10 55 35. 9	AG Harvard 7191	3	26	183	B.	
20 48 41. 31	−20 5 30. 8	AG Algiers 8957	4	26	388	Bn.	Brt. field.
22 58 33. 45	+19 16 18. 9	Abbadia A 13624	2	26	183	B.	

Jan. 4, 1911, star *e* referred to BD+20°718, $\Delta\alpha=-0^m\,20^s.96$, $\Delta\delta=-6'\,27''.4$. Dec. 30, 1910, star *f* referred to BD+20°716, $\Delta\alpha=+1^m\,23^s.89$, $\Delta\delta=+8'\,14''.2$. Jan. 4, 1911, star *g* referred to star *d*, $\Delta\alpha+0^m\,13^s.57$, $\Delta\delta=-0'\,42''.5$. For 1910.0 star *d* taken as $\alpha=4^h\,8^m\,21^s.2$, $\delta=+20°24'.1$.

NOVÆ

Mean Place of Comparison Star for Beginning of Year		Authority	Seeing	Inst.	Power	Obsr.	Remarks
α	δ						
h m s	° ′ ″			in.			
6 51 23. 01	+32 24 18. 3	AG Leiden 2889	2	12	160	Ws.	
6 51 23. 01	+32 24 18. 3	AG Leiden 2889	4	12	115	Ws.	Tr. wires v. ft., especially where star transited. Brt. moonlight.

Apr. 8.3, 1912, Ws. Comparisons with finder of 12-inch equatorial. Nova much fainter. I now notice a decided reddish tinge. Slightly brighter than BD+32°1433 (7.0). Considerably fainter than BD+33°1433. A little brighter than BD+32°1460 (6.8), which is nearly white. Slightly fainter than BD+35°1511. About the same as BD+34°1536 (7.0), possibly a little fainter. In 12-inch equatorial color seems to be orange. Seeing poor.

May 10.4, Ws. Hazy. Seeing fair. Color in 12-inch equatorial, orange. Brightness about halfway between that of BD+32°1433 (7.0) and BD+32°1437 (8.0). Considerably brighter than BD+32°1421 (7.8), white. Slightly brighter than BD+32°1458 (8.3), white. Slightly fainter than BD+32°1460 (6.8), white. Surrounding stars are all white and comparisons are very uncertain owing to decided red tinge.of Nova. Comparisons made with finder of 12-inch equatorial.

June 1.3, Ws. Hazy. Strong twilight. Color in 12-inch equatorial orange, strongly tinged with red. A shade brighter than BD+32°1437 (8.0). About the same as BD+32° 1447(8.3), possibly a little brighter. Much fainter than BD+32°1460 (6.8).

17 54 32. 82	−27 36 14. 5	Córdoba B 11541	--	26	---	Ep.	Appeared as ordinary star. Est. mag. same as CD −27°12233 (9.9).
18 44 29. 69	+ 0 25 53. 2	AG Nicolajew 4685	3	26	183	Hl.	Est. mag. −0.3. Bright field.
18 44 29. 69	+ 0 25 53. 2	AG Nicolajew 4685	4	26	183	Hl.	Est. mag. +0.5. Less bright than on June 9. Bright field.

June 13.5, 1918, Hl. Nova Aquilæ appears to be a little less bright than Altair at 16^h Gr. M. T. June 15, $16^h\,20^m$ Gr. M. T. Nova Aquilæ about ½ mag. fainter than Altair. Hl.

19 57 11. 39	+53 20 14. 3	AG Harvard 6303	3	26	183	B.	Est. $4^m.6$ at 16.3 G. M. T. Harvard scale with 2 in. binoculars. Bright field.

Oct. 21.3 B, with 5-inch finder, at $12^h.5$ G. M. T., Nova Cygna about equal to BD+53°2321 (9.1). Nov. 3.3 B, with 5-inch finder, at $12^h.7$ G. M. T., Nova about equal to BD+53°2329 (9.2). Nov. 13.3 B, with 5-inch finder, at $12^h.6$ G. M. T., Nova about equal to BD+53°2321 (9.1) and ¼ from BD+53°2330 (8.9) to BD+53°2329 (9.2). Nov. 18.3 B, with 5-inch finder, at $12^h.4$ G. M. T., Nova ½ from BD+53°2330 (8.9) to BD+53°2329 (9.2). Nov. 20.3 B, with 5-inch finder, at $12^h.3$ G. M. T., Nova ⅓ from 2330 (8.9) BD+53° to BD+53°2329 (9.2).

NEBULÆ

Mean Place of Comparison Star for Beginning of Year		Authority	Seeing	Inst.	Power	Obsr.	Remarks
α	δ						
h m s	° ′ ″			in.			
9 1 35. 45	+ 7 31 33. 5	AG Leipzig II 4958	3	26	183	Bn.	Visible in 5-in.
23 45 0. 11	+ 0 35 33. 1	AG Nicolajew 5898	3	26	183	Bn.	V. faint. Not in Dreyer's N. G. C.

MISCELLANEOUS OBSERVATIONS

MISCELLANEOUS OBSERVATIONS

POLAR CAPS OF MARS

The position angle of the south polar cap of Mars, referred to the center of the planet, was measured by HALL on September 8, 1909. The mean of four settings was 156°.59 at $14^h\ 20^m$ W. M. T. There was a range of 2°.47 among the readings. The seeing was good, but the observation was stopped by fog.

JUPITER'S CLOUD FORMS

Cloud forms were seen on Jupiter August 15.3, 1913, by HALL, when the planet was shown to visitors. BURTON noted, August 16.3, that the "cloud forms" were well defined and appeared near the center of the disk; also to the right of the center. One cloud form was archshaped, the inside of the arch being approximately a semicircle, and gradually became very thin at the top; that is, toward the south limb of Jupiter.

SATURN AND RINGS

The following notes were made in regard to Saturn and the rings about the times the earth passed through the plane of the rings:

October 29, 1907, Hammond.—Examined Saturn to-night and could see faint traces of the ring on both sides of the planet but more conspicuous on the left or preceding side. At times I thought I noticed a protuberance on the ring at the extreme left but am not certain. The seeing is very unsteady and poor. All the satellites very diffuse.

October 30, 1907, Hammond.—The rings are quite plain to-night. There seems to be something like a protuberance on the preceding side and perhaps one on the following side. At times I thought I could see the four protuberances symmetrically situated on the ring but am not positive. I measured the one on the left or preceding side from the limb of Saturn, setting the micrometer parallel with the ring. From preceding limb it was 8″.8; from following limb, 28″.3.

January 3, 1908, Hammond.—Looked at Saturn in early evening and there was no trace of the rings or knots visible. The shadow of the ring on the ball was remarkably sharp and distinct. It was very clear and the seeing was excellent.

On January 5, 1908, Hammond.—At 6^h W. M. T. examined Saturn again with powers 175 and 388 and could not see the ring or knots. Seeing fair. Sky very clear.

November 13.6, 1920, Hall.—Looked at Saturn, hour angle -5^h. Seeing poor at this altitude. Saw shadow of ring on ball. Could not see ring.

November 18.7, 1920, Hall.—Looked at Saturn from hour angles -4^h to -3^h. Seeing poor. Could not see rings with power 388. With power 183 the rings appeared as needles of light, one on each side of the planet, that one on the east side being the longer, apparently. At the end of each needle there seemed to be a nodule. Measured double distances of nodules from east and west limbs, respectively, having set the middle long wire approximately parallel to ring: From east limb to east nodule=13″.3. From west limb to west nodule=6″.6. Two settings in each case.

November 25.7, 1920, Hall.—Saturn, power 183. Seeing poor, moonlight. Could see shadow of ring on ball and a line of light on each side of ball and close to it. One nodule or satellite on east side, three nodules or satellites on west side.

Object on east side of planet, probably a star. With power 388 and with middle long wire set parallel to major axis of ring measured: From west limb to object on east side 84″.6, at $15^h\ 43^m\ 38^s$ Washington mean time. From east limb to object on east side 66″.7 at $15^h\ 44^m\ 4^s$ W. M. T.

Three objects on west side of planet, power 367

From east limb:

	W. M. T.				W. M. T.			
	h	m	s	″	h	m	s	″
a	16	14	25	48.4	16	24	32	39.9
b	16	16	26	49.4	16	23	42	40.3
c	16	19	13	68.1	16	21	48	58.9

From west limb:

	W. M. T.			
	h	m	s	″
a	16	34	40	31. 3
b	16	30	58	31. 2
c	16	24	24	49. 8

Object *b* may be Tethys. During the measures *a* and *b* ehanged their relative positions. Measures poor.

December 11.7, 1920, Bower.—Saturn, power 183. Measured interval from preeeding and following limbs to gap on preceding and gap on following side.

At $15^h 54^m$ W. M. T.:

From preceding limb to gap on preeeding side 14″.1.

From following limb to gap on following side 14″.4.

Measures rough. Gaps certain and distinct but not wholly lacking in ring material. Gaps estimated to be 3″ in width.

December 20.7, 1920, Bower.—Saturn, powers 183 and 388, from $15^h 23^m$ to $15^h 53^m$ W. M. T. Seeing fair. Image poor with higher power. Gaps in ring seen about the same as on December 11. There seems to be some material in them, but not sure. Preceding side of ring seems a little fainter than following side.

December 31.6, 1920, Hall.—Gaps in rings as on December 11. Considerable haze. Could not tell as to ring material in gaps.

January 27.5, 1921, Hall.—Saturn, at about -3^h hour angle. Seeing poor. A thin line of light on each side. Ring fainter than on December 20.

February 6.5, 1921, Hall.—Saturn, power 388. The ring a faint line of light on eaeh side of the ball. Shadow of ring on ball a distinct dark line.

February 11.4, 1921, Bower.—Saturn. Thin needle of light on either side. Shadow of ring on ball easily visible.

February 14.7, 1921, Hall and Bower.—Saturn, power 183. Ring visible as a thin needle of light on either side; looks like a faintly illuminated wire. Shadow of ring on ball easily visible.

February 22.5, 1921, Hall.—Saturn, powers 183 and 495. Ring visible as a line of light on eaeh side of ball, with both eyepieces, and with dark field and bright field.

March 11.4, 1921, Bower.—Saturn. Ring more narrow elose to ball of planet than in remaining length.

METEORS

The following notes were made in regard to meteors:

November 12.6, 1909, Eppes.—Looked at λ Geminorum and ϕ^2 Orionis at $12^h 43^m$ W. M. T.; ϵ and γ Leonis at $13^h 38^m$; ϕ and o Ursæ Majoris at $13^h 43^m$; Polaris at $14^h 3^m$; ι and ϕ Ursæ Majoris at $14^h 11^m$. There was no shower.

August 9.6, 1913, W. M. T., Hall and Burton.—Looked for Perseids about three hours, until daylight. Saw about 25. Haze interfered somewhat.

Observations of telescopic meteors with the 26-inch equatorial, published in the Astronomical Journal, No. 864.

W. M. T.	Obsr.	Time at Tel.	Mag.	Color	p	W. Sid. T.	Hour Angle	δ	Remarks
1924		h			°	h m	h m	°	
Apr. 26. 6	Bower.	1. 5	10	White.	90	15 8	23 57	−4. 0	
			13	Red.	175	15 43	0 30	−2. 5	A.
			12	White.	230	16 28	1 10	−3. 0	
May 5. 2	Willis.	0. 3	10	White.	210	13 4	0 15	+9. 1	
			12	Yellow.	90	13 36	22 18	−3. 9	
	Bower.	1. 0	12	Red.	205	14 15	22 42	−3. 8	

A. Direction of motion in the field changed +3°.

These meteors were noted while sweeping for comets whose positions were imperfectly known. The diameter of field used was 12′. The third column gives the estimated time that the eye was at the telescope. The column "*p*" gives the position angle from which meteors seemed to come.

In August, 1926, HALL looked at Perseus and vicinity and noted meteors as follows:

Date	W. M. T.	Number of Meteors	Remarks
1926	h m h m		
Aug. 7	12 47—14 27	12	Haze at first.
8	11 57—14 2	3	Clear.
9	11 52—14 32	9	
10	11 27—15 37	25	
11	11 27—15 37	24	Haze a good deal of the time. White streaks. Occasionally a streak seemed yellowish.
12	13 2—15 37	12	Perseus became visible through clouds at 13^h 2^m W. M. T. At intervals, quite clear about this constellation.

AURORA

May 14.5, 1921, Bower.—Aurora (probably all night). Very thick haze and sky half clouded. Radiant point of streamers fairly well defined occasionally. Rough estimate of position, 3° to 5° east of meridian and 15° to 20° south of zenith.

At one time an irregular area of about 5° to 10° radius covered with light was seen at the radiant point except for a sector of 5° to 10° opening. This opening closed suddenly with a noticeably brighter, pinkish light. No other color was noticed during the display except a suspicion of red occasionally.

Many patches persisted for a few minutes at various times at almost any point of the sky.

Streamers and confused masses of light near radiant (streamers seen nearly endwise?) always seemed to drift with the clouds, but radiant seemed to remain practically stationary.

EXAMINATION OF FAINT OBJECTS IN THE FIELD WITH URANUS

By R. BURNSIDE POTTER

NOTE.—Mr. R. BURNSIDE POTTER was an inspector at the Naval Observatory of ships' telescopes and binoculars during the World War. He is an amateur astronomer who seems to have excellent vision. He wished to use one of the telescopes at the Naval Observatory, and it was suggested to him that he make an examination of the fields about Uranus, since for many years it has been thought that there may be moons of that planet additional to those now certainly known.

Mr. POTTER's data follow—all times are given in Washington mean time:

p=position angle of object with respect to Uranus.
s=distance of object from the center of Uranus.

1918

July 2.—$13^h \pm 1^h$. Seeing good, power 367 (?). All four satellites easily visible, also belts. Ariel was nearest at 185°, 11″. An object nearly south (might be north), nearer planet than Ariel (certain), and fainter. A second object (certain) at 305°±, still fainter, and still nearer planet. Think it would have been brighter at the same distance. [This observation entered from memory December 9, 1918. The date is certain.]

July 9.—$13^h \pm 1^h$. Seeing good, power 367 (?) All four satellites easily visible, also belts (certain). Umbriel was nearest at 22°, 11″. An object nearly north (might be south), nearer planet than Umbriel (certain), and fainter. [This observation entered from memory December 9, 1918. The date is certain.]

July 20.—Saw Ariel and Umbriel. With occulting bar over planet, saw faint object at about 175°, 9″. Seen by Hall with and without bar.

14^h 19^m, p=180°, s=9″ (estimate).

15^h 13^m, distance from limb of planet=7″.2 (2 settings).

July 21.—With power 360 and occulting bar, saw all four satellites with and without bar, and an object at 350°, 9″ at $14^h\ 7^m$. A setting gave 353°. Seen by Hall. A second object, very doubtful, at 80°, 5″. With power 495, saw all objects, more sure of doubtful objects. $15^h\ 41^m$, $p=85°$, $s=4''.8$ (estimate).

July 22.—Power 360 with bar, moonlight, haze. Saw objects without bar, 320°, 17″; 110°, 9″ (not certain); Umbriel 131°, 10″; Titania 180°, 28″; Oberon 29°, 22″; after this bad seeing. Then saw Ariel 177°, 13″; verified all objects seen before bad seeing, except that one at 110° still uncertain.

August 1.—Power 367, air steady but misty. Ariel, Titania, and Oberon easy. Seen by Hall. Umbriel seen occasionally. An object at 355°, 7″, not more difficult than Umbriel. $13^h\ 56^m$, $p=358°.6$, $s=7''.2$ (setting).

August 6.—Power 367, seeing rather poor. Titania 119°, 14″ and Oberon 118°, 18″ very difficult to separate. Saw Ariel 168°, 14″ by glimpses and Umbriel 339°, 18″ without much difficulty.

$12^h\ 45^m$, an object at 195°, 17″ (estimate).

$12^h\ 49^m$, a second fainter object at 15°, 12″ (estimate).

$13^h\ 46^m$, the second fainter object at 15°.6 19″.9 (2 settings).

All objects seen by Hall.

August 15.—Seeing poor at first, improved later. Ariel 358°, 13″ very difficult. Umbriel 2°, 16″ visible most of time. Two other objects constantly visible.

$11^h\ 59^m$, first object at 230°, 15″ (estimate).

$12^h\ 38^m$, second object at 334°, 23″ (estimate).

All objects seen by Hall except not sure of Ariel.

September 1.—Seeing excellent. Powers 367 and 495. Saw all four satellites and at $9^h\ 55^m$, an object at 330°, 7″.5 (estimate).

$12^h\ 37^m$, $p=304°.5$, $s=9''.6$ (4 settings, each coordinate).

All objects seen by Hall except Ariel.

September 13.—Seeing poor, much better at intervals. 360 with red glass and 495. Both Hall and Potter saw all four satellites, Umbriel brighter than Ariel. Potter suspected object at 45°, 7½″.

September 15.—Air steady but misty. Moonlight. Umbriel brighter than Ariel. Object at 290°±.

$10^h\ 57^m$, $p=288°.1$, $s=11''.3$ (2 settings each).

All objects seen by Hall except did not look for Ariel.

September 22.—Moonlight and haze. Saw all four satellites except not sure of Umbriel. Held steadily two objects in periods of better seeing.

$9^h\ 45^m$, first object at 167½°, 8½″ (estimate).

$9^h\ 53^m$, second object at 35°, 14″ (estimate).

All satellites seen by Hall except Umbriel.

September 23.—Seeing excellent at first. Power 495. Moonlight. Slight mist, increasing later. Belts very distinct. Both Hall and Potter saw objects in following order of brightness, Oberon, Titania, Ariel, object, Umbriel, without knowing their positions.

$10^h\ 12^m$, object at 356°.5, 10″.3 (1 setting).

$10^h\ 31^m$, another object at 77°.4, 9″.6 (1 setting), probably not Umbriel at 167°, 19″ as recorded.

September 28.—Air steady but misty. Good seeing for short periods only. Belts ill defined. Both Hall and Potter saw all four satellites, but Umbriel difficult. $10^h\ 51^m$, Umbriel, $p=210°.2$, $s=8''.7$ (1 setting). An object as easy as Ariel at 315°, 11½″ (estimate). All preceding objects seen by Hall. Saw a second faint object at 270°, 6″. $11^h\ 26^m$, $p=293°.7$, $s=7''.1$ (1 setting, poor).

September 29.—Air steady but misty. Belts better defined. Powers 360 and 495. Saw objects in following order of brightness, Oberon, Titania, Umbriel, Ariel, faint object in second quadrant.

$10^h\ 21^m$, $p=147°.8$, $s=6''.4$ (1 setting).

$10^h\ 36^m$, $p=147°.0$, $s=9''.4$ (1 setting).

All objects seen by Hall.

October 3.—Air steady, some haze. Seeing good for most part. Powers 360 and 495. Saw in order of brightness, Titania, Oberon, Umbriel, Ariel, faint object near planet in second quadrant; and later a second object at 260°± easier than Ariel. Satellites very easy except Ariel.

$8^h\ 50^m$, faint object, $p=110°.6$, $s=5''.8$ (3 settings, s is thought to be small).

$10^h\ 14^m$, second object, $p=275°.0$ (careful estimate).

$10^h\ 27^m$, second object, $p=274°.2$, $s=12''.7$ (1 setting).

All objects seen by Hall except did not look for second object.

October 6.—Seeing poor, power 367. Saw all four satellites, Ariel only by glimpses. Thought Oberon unusually faint. $10^h\ 29^m$, an object at $p=338°.6$ (1 setting), $s=8''$ (estimate).

All objects seen by Hall except Ariel.

October 21.—Seeing very good for short periods only, when belts were very distinct and colors marked. Power 367. Saw all four satellites and two objects, at one moment, simultaneously. First object not as bright as Umbriel, about as bright as Ariel.

$7^h\ 8^m$, $p=335°$, $s=8¼''$ (estimate).

$7^h\ 52^m$, $p=345°.3$, $s=10''.7$ (2 settings each).

Second object:

$7^h\ 8^m$, $p=275°$ (estimate), $7^h\ 37^m$, $s=10''$ (estimate).

$8^h\ 20^m$, $p=283°.2$, $s=15''.7$ (1 setting each).

First object easier than Ariel and second object about equal. Umbriel at first much easier than either object, but as it approached the planet it became more difficult and was distinctly less easy than first object toward last. [Some confusion, apparently, about relative brightness.]

All objects seen by Hall except did not look for Ariel and Umbriel.

October 22.—Seeing fair, power 367. Satellites found without knowing their positions. Oberon especially bright.

6^h 49^m, object at 260°, 5½″ (estimate).
6^h 54^m, object at 130°, 10″ (estimate).
6^h 56^m, object at 25°, 11″ (estimate).
7^h 1^m, Ariel 340°, 13″ (estimate).
7^h 4^m, Umbriel 165°, 18″ (estimate).
7^h 10^m, quite sure of objects in order of brightness, Oberon, Titania, Umbriel, Ariel.

Object at 130°, object at 25°, object at 260°. Nothing else nearer than Oberon. A star in third quadrant brighter than Titania and about as far away as Oberon.

7^h 26^m, with right eye, p=267°.3, s=6″.6 (1 setting each).
7^h 41^m, with left eye, p=121°.7, s=11″.0 (1 setting each, good).

Power 495 after this point:

8^h 34^m, with right eye, p=285°.5, s=5″.4 (1 setting each).
9^h 0^m, with right eye, p=133°.1 (1 setting, difficult, moonrise).
9^h 4^m, with left eye, s=7″ (1 setting, difficult, moonrise).

All objects seen by Hall, except did not look for one at 260°, but Ariel, Umbriel, and object at 130° were difficult.

November 2.—Poor seeing. Belts very indistinct. Disk fuzzy. Saw all four satellites, Ariel only with difficulty after being told position. Certainly saw difficult object at p=355°, s=10″.5 (estimate).

9^h 0^m, p=358°.3 (1 setting). Too indistinct to measure in distance.

All satellites seen by Hall except Ariel.

November 3.—Seeing good. Haze. Power 367. Saw all satellites easily. Saw an object as easy as Ariel about north, also a second object, more difficult, about south.

6^h 31^m, second object, p=185° (estimates), p=182°.7 (1 setting).
6^h 37^m, first object, p=353°.3 (1 setting).
6^h 41^m, set wire on belts, p=90°.4.
6^h 54^m, first object, s=6″.6 (1 setting).

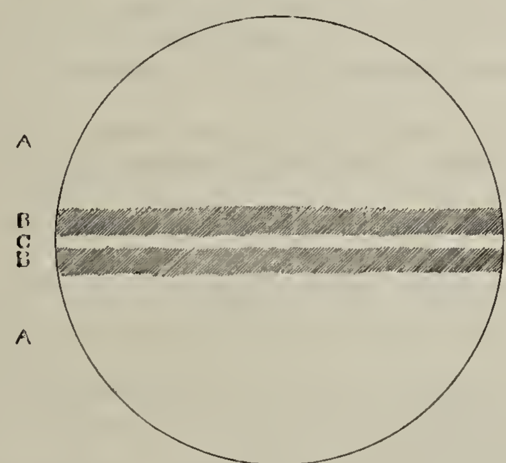
Power 495:

7^h 42^m, first object, p=2°.9, s=6″.8 (1 setting).
8^h 10^m, second object, p=184°.8, s=6″.9 (1 setting).

Power 360 with bar. Saw all objects with and without bar. A third object as easy as Umbriel with all eyepieces, p=same as Oberon, s=16″. All objects seen by Hall except second and third objects.

November 5.—Seeing good. All four satellites easy. Belts distinct and colors marked. As usual when good seeing, Titania and Umbriel much redder than the others and Oberon very yellow. Power 367. 6^h 23^m, belts at p=90°.5 (1 setting); width=0″.64 (1 setting). This width is too great by the diameter of one wire (about 0″.16); setting was on outer limits of belts. When looked with power 495 later, this measure thought excessive.

Belts of Uranus



A=Greenish yellow, B=orange, C=silver

6^h 41^m, object at p=135°, s=9″ (estimate); a little more difficult than Ariel but held steadily.
6^h 59^m, p=139°.4, s=8″.8 (1 setting each).

Power 495:

$7^h\ 8^m$, second object easier than Ariel. Suspect a third object nearer planet and at slightly less position angle.

$7^h\ 18^m$, second object, $p=6°.6$, $s=10''.1$ (1 setting each).

$7^h\ 27^m$, third object, $p=5°.8$, $s=6''.0$ (1 setting each).

$7^h\ 42^m$, first object, $p=136°.9$, $s=7''.3$ (1 setting each).

$8^h\ 11^m$, first object, $p=144°.5$, $s=9''.1$ (1 setting each), setting in s interrupted by clouds.

A fourth object in fourth quadrant still visible in approximately same place. Same as "third object" on November 3. The second object seems to be moving in direction of the satellites. Can not see any change of position in first object. Change of position of Ariel can be noticed.

November 10.—Poor seeing. Powers 367, 360 with bar, and 183. Belts indistinct. Moonlight. Found all satellites except Titania. Saw Titania when told position. Suspected an object between Ariel and planet about three-fourths of former's distance at slightly less position angle. Ariel was at 167°, 13''.

$7^h\ 41^m$, a second very faint object at 345°, $s=8\frac{1}{2}''$ (estimate), $p=355°.3$ (1 setting, poor). Estimated s not free from bias.

November 20.—Poor seeing. Power 367. Belts indistinct but visible part of time. Disk sometimes sharp. All satellites visible, Umbriel nearest at 10''. As usual, Titania much redder than Oberon at 15°.

$6^h\ 43^m$, an object at 10° (careful estimate), $8\frac{1}{2}''$ (estimate) difficult.

$6^h\ 55^m$, seems to be second object at $p=355°$ and nearer planet.

Objects about 3'' or 4'' apart. Object at 10° seems farther from planet than above estimate.

$7^h\ 24^m$, not sure of two objects, but suspect two. Line between planet, object at 10° and Oberon seems to be straightening out. Interrupted by clouds.

November 22.—Poor seeing. Belts occasionally visible and disk sharp half of the time. Saw all satellites, except not sure of Ariel at 60°, 5''.

$6^h\ 5^m$, an object at 165°, 9'', a second object at 15°, 9''.

$6^h\ 31^m$, first object, $p=160°$, $s=8\frac{1}{2}''$ (more careful estimate); second object, $p=15°$, $s=10''$ (more careful estimate).

$6^h\ 59^m$, first object, $p=166°.8$, $s\,10''.2$ (1 setting each).

$7^h\ 11^m$, second object, $p=352°.4$, $s=12''.3$ (1 setting each, poor, difficult).

$7^h\ 23^m$, first object, $p=153°.9$, $s=10''.9$.

Setting in s probably good but unfinished in p. Many small stars in field but only one nearer than 10'', at 270°.

Note added after leaving telescope.—Think that setting on second object at $7^h\ 11^m$ was probably on a third suspected object not mentioned at telescope, at about 355°.

November 23.—Seeing rather poor. Power 367. All satellites easy. Umbriel fainter than Ariel.

Power 360 with bar. $6^h\ 26^m$, an object at $52\frac{1}{2}°$ (careful estimate).

Power 367. $6^h\ 42^m$, $p=57°.2$ (by setting; very difficult). With circle set at $p=57°.2$, could notice rapid increase in position angle.

$7^h\ 0^m$, $s=5''.8$ (estimate).

$7^h\ 12^m$, $s=7''.1$ (1 setting).

$7^h\ 29^m$, $p=60°.9$ (2 settings).

Many stars in field but none nearer than Oberon.

December 3.—Seeing very bad. Powers 388 and 360 with bar. Titania brighter than Oberon. Oberon usually brighter. Separated Ariel at 182°, $11\frac{1}{2}''$ and Umbriel at 178°, 17'' with difficulty.

$6^h\ 5^m$, suspected object very close to planet at 85°.

$6^h\ 5^m$, suspected a second object at 265°, $7\frac{1}{2}''$. Later estimate at 270°, still later at 275°, but only suspected.

December 4.—Seeing poor. High wind but instrument steady. Clear horizon. Power 360 with bar. Titania at 356°, 29'' brighter than Oberon at 20°, 20''. Umbriel at 310°, 9''. Ariel at 350°, 13''.

$6^h\ 3^m$, object at $225° \pm$.

$6^h\ 21^m$, second suspected object between Ariel and Titania in position angle and at a less distance than Ariel.

Power 495. Still suspect second object. Belts glimpsed.

Power 367. $6^h\ 49^m$, second object, Ariel and Titania seem almost in a straight line, much straighter than before.

$6^h\ 56^m$, planet, second object, and Titania form a straight line; Ariel having not so great a position angle. Very uncertain.

$7^h\ 4^m$, second object, $s=7\frac{1}{2}'' \pm$.

December 5.—Seeing poor. Belts visible. Haze. $6^h\ 12^m$. Saw all satellites except Oberon and object at $280° \pm$, when stopped by clouds.

December 6.—Seeing rather poor. Belts seen occasionally, ill defined. Much haze. Moon at first, about two hours west of planet and three days old.

Power 388:

$6^h\ 5^m$, first star, $p=323°.8$, $s=130''.9$ (1 setting each by Hall). Twilight. Second star, $p=80°$, $s=75''$ (estimate), much fainter than first star. Third star, $p=90°$, $s=87''$ (estimate), very much fainter than second star.

$6^h\ 17^m$, saw Oberon and suspected an object at 340°, 15″, not as bright as Oberon.

$6^h\ 28^m$, suspect a second object at 235°, 10″. Probably a star.

$6^h\ 35^m$, have suspected a third object at 85°, 8½″ for some time. Very difficult. Don't hold it, but sure it is there.

Power 360, with diaphragm, reducing field to 90″. $6^h\ 50^m$, sure of Oberon and second object, suspected third object, but did not see first object.

Power 388:

$6^h\ 54^m$, position angle of first object seems to be diminishing.

$6^h\ 55^m$, third object seemed nearer planet than above estimate.

$6^h\ 57^m$, suspect fourth object (perhaps Ariel) at 320°±, 11″.

$7^h\ 2^m$, two objects seem to be between Oberon at 138°, 23″ and planet. One is surely Titania at 110°, 12″; the other is a fifth object at 138°±, 9″ or less, very difficult.

$7^h\ 25^m$, sure of Oberon, Titania, and at least three objects. Strongly suspect fifth object to be real. p seems a little greater than Oberon's. Also strongly suspect fourth object.

This night especially devoted to noting objects closer to planet than Oberon. Eyes in very good condition and used alternately. Not perfectly positive of any objects except Oberon, Titania, and the three stars.

December 12.—Air steady. Periods of good seeing brief. Belts not seen. Moon, nine days old, about three hours away. Power 388.

$5^h\ 55^m$, suspected an object at 42½°, much nearer than Titania.

$6^h\ 0^m$, suspected a second object one-third way in from Titania—not sure which was Titania—which was at 345°, 29″. Titania brighter than Oberon. Oberon brighter than second object.

Power 495. Suspected Ariel after knowing position, 20°, 8″.

$6^h\ 55^m$, second object seems to have smaller position angle than Titania. It appeared greater before.

$6^h\ 57^m$, first object, $p=45°.2$ (perhaps too large), $s=7''.3$ (1 setting each, difficult). Stopped by clouds.

Umbriel at 250°, 6½″, not found. Rough setting, thought to be large, on north and south diameter of planet gave 3″.6; American Ephemeris gives 3″.3.

1919

January 8.—Note on above observations. Throughout the quality of the seeing has been partially estimated by the distinctness of the markings which sometimes appear as belts. This should be taken into account when the axis of rotation is definitely determined.

July 6.—Seeing poor for most part. Powers 495 with bar and 388. Saw all four satellites except not sure of Umbriel. Ariel not difficult without bar. Suspected an object in third quadrant.

August 20.—Seeing fair—poor, haze. Saw all satellites. Ariel more or less difficult except at periods of good seeing. An object, certain but very difficult at 15°, 6″ (power 388). $12^h\ 12^m$, above object at $p=20°$, $s=5''.3$ (estimate). Power 495.

Object seemed to be at about one-half distance of Ariel (329°, 9½″). Saw in order of brightness Oberon, Titania, star in first quadrant, Umbriel, Ariel.

August 26.—Suspected an object at 160° at $11^h\ 43^m$.

September 3.—$9^h\ 55^m$, an object (certain) at $p=8½°$ (1 setting).

September 16.—Very hazy, but fairly steady. Uranus ill defined. Power 495. Ariel, 172°, 13½″, rather difficult. Umbriel, 330°, 14″, very easy. Suspected an object at 195°, 9½″ (estimate).

$9^h\ 58^m$, $p=190°.8$ (1 setting, without glasses).

A second object (certain) at 10°, 6½″–7″.

$9^h\ 46^m$, $p=3°.4$ (1 setting).

$10^h\ 14^m$, $p=7°.1$ (1 setting, without glasses).

September 18.—An object at 170°, doubtful. $10^h\ 10^m$, a second object at $p=190°$, 7½″ (estimate).

September 25.—Seeing poor, fair at times. Saw all four satellites without previously knowing positions except possibly Oberon. Ariel, not easy. $7^h\ 59^m$, an object at 20°, 8¾″ (estimate, rough in position angle).

$7^h\ 59^m$, a second object, suspected at 200°, 8¾″ (estimate).

$8^h\ 59^m$, second object seems to have gained on first, but second object not certain.

$9^h\ 3^m$, first object at $p=35°$, $s=7''$ (estimate, rough in position angle).

$9^h\ 25^m$, first object, $p=30°$, $s=6''$ (2 estimates), $p=16°.6$ (2 settings).

$9^h\ 52^m$, first object, $p=35°$, $s=6''$ (estimate), $p=18°.4$ (setting between double wires 3½″ apart).

$9^h\ 59^m$, can still see first object between wires, but think last setting in position angle too great. This object seen with both eyes with glasses, and with right eye without glasses, with powers 771, 388, and 367.

All four satellites, seen by Hall, Ariel, and Umbriel not bright enough to measure. Did not see other objects.

September 26.—Seeing poor, quite fair for short periods. Power 495. Saw all four satellites, though Umbriel not till $10^h\ 8^m$.

$8^h\ 43^m$, an object, p=between Titania and north point, $s=7\frac{1}{2}''$. Sure of this object, but could not measure it. Belts now visible but not distinct.

$8^h\ 47^m$, second object very difficult, at 185°, approximately.

$9^h\ 1^m$, second object, $p=183°.4$ (1 setting).

Power 771. $9^h\ 13^m$, first object, $p=0°.1$ (1 setting).

Power 495, $10^h\ 8^m$, first object, $p=8°.9$ (1 setting), $s=6''$ (estimate). Setting with double wires about $3\frac{1}{2}''$ apart.

ORBITS OF THE SATELLITES

OF

MARS, SATURN, URANUS, NEPTUNE

CORRECTIONS TO ELEMENTS OF THE ORBITS OF THE SATELLITES OF MARS

FROM

OBSERVATIONS IN 1909

CORRECTIONS TO ELEMENTS OF THE ORBITS OF THE SATELLITES OF MARS, FROM OBSERVATIONS IN 1909 MADE WITH THE 26-INCH EQUATORIAL

By ASAPH HALL

The measures were taken in the x and y coördinates, that is, $\Delta\alpha \cos \delta$ and $\Delta\delta$, with the driving clock running. One thread was made tangent to a limb of the planet and another was placed over the satellite. For each coordinate four measures were made, which were arranged symmetrically, so as to have, for example, preceding limb, following limb, following limb, preceding limb. Also, the coordinates were measured symmetrically among themselves, as, for instance, y, x, x, y. For the second x and the second y the position circle was changed by 180° from the setting for the first x and the first y.

To obtain the coordinates as printed, the following corrections have been applied to the measures: (1) for differential refraction, according to FREDERICK's tables prepared for the Naval Observatory, that is, Appendix III of Volume IV, Second Series; (2) for instrumental constants, computed according to the formulas and with the notation of the same tables, but with slightly modified values, deduced from later determinations than those given in the tables; (3) for the phase of the planet, so as to obtain coordinates of the satellites referred to the planet's center. The data for phase were taken from the *British Nautical Almanac.* (4) for the motion of the satellites, to reduce the mean of four measures to the mean of the corresponding times.

The values of the instrumental constants used in these reductions are:

$\eta = +110''.8 \quad \xi = -64''.9 \quad c = +114''.6 \quad i_1 = +54''.6 \quad e \cos \phi = +3''.66 \quad f = +0°.014$

The object glass was removed from its cell and cleaned November 13, 1912.

The screw value of micrometer Clark II used for these measures is $R = 9''.9337 + 0''.00006$ (T° − 50° F.), which was determined by myself. The value of Professor SEE is $R = 9''.9328 - 0''.000055$ (T° − 28° F.). (See Vol. VI of the Naval Observatory, Second Series, p. A XVI.)

For the observations eyepiece 3C was employed. One half of the front of the eyepiece, near the focal plane, was covered by a semicircular piece of red glass, behind which the planet was placed when the measures were made. With this arrangement the planet and the satellites were not in quite the same focus. The eyepiece was focused on the satellites.

Circular elements of the orbits of the two satellites referred to the equator were assumed as follows for September 20.27944, 1909, Washington mean time corrected for light time:

	Phobos	Deimos
E	86°.521	66°.906
N	47°.787	43°.827
I	36°.488	37°.341
a	8″.491	21″.246

The values of a correspond to the mean distance of Mars from the sun=[0.18290]. The mean daily motions were taken as equal, respectively, to 1128°.84396 and 285°.16198.

The observation times as given have been corrected for light time. By means of the formulas of Bessel given in Band 9 of the *Astronomische Nachrichten* places of the satellites were computed from the assumed elements for the times of observation, and observation equations were formed for the correction of the assumed elements.

Each observation equation corresponds to the mean of four pointings and is taken in the sense computed minus observed.

In the observations of Phobos half weight is given to the second equation for y of August 24, to the second equation for y of September 13, and to the second equation for x of October 2. In the observations of Deimos half weight is given to the second equation for x of August 26 and to the equation for x of October 2. All other weights are unity.

The last two observations of Deimos of September 10 and the first two of September 24 were made by J. B. Eppes.

Since the driving clock of the 26-inch equatorial has periodic errors, it was apparently more difficult to make the measures in the $\Delta\alpha \cos \delta$ coordinate than to observe the differences of declination. Therefore the observation equations for corrections to the assumed elements have been solved twice, double weight being given to the y measures in the second solutions. In the case of Phobos the weights employed are 109/165 and 218/165, for the x and y equations, respectively. For Deimos the weights are 112/168 and 224/168, or 2/3 and 4/3.

Both sets of residuals were obtained by substituting in the weighted equations.

The two solutions for each satellite agree well, as they ought. Most of these computations were made by Messrs. Eppes and Burton, though portions of them were made by Messrs. Frederickson and Watts and by myself.

Phobos

Date	W. M. T.[1]	Obs. x	dx	v_1	v_2	W. M. T.[1]	Obs. y	dy	v_1	v_2
1909	h m s	''	''	''	''	h m s	''	''	''	''
Aug. 23	12 51 56	+26.67	−0.13	−0.357	−0.294	13 9 58	+15.57	−0.19	−0.330	−0.384
23	13 43 41	+18.80	+0.78	+0.147	+0.115	13 28 4	+16.72	+0.07	−0.097	−0.117
24	12 1 26	+25.38	+0.85	+0.554	+0.446	12 17 57	+15.93	+0.48	+0.328	+0.371
24	-- -- --	-----	----	-----	-----	12 32 7	+16.34	+0.81	+0.444	+0.506
25	14 51 37	−26.48	+0.28	+0.034	+0.026	15 3 15	−16.63	+0.25	−0.075	−0.089
25	15 34 58	−17.81	−0.40	−0.456	−0.375	15 16 16	−17.02	−0.14	−0.413	−0.476
26	13 20 5	−27.06	+0.29	−0.229	−0.190	13 31 52	−13.16	+0.26	−0.214	−0.249
26	13 58 41	−25.29	−0.05	−0.231	−0.191	13 44 16	−15.03	+0.32	−0.087	−0.105
Sept. 5	11 44 45	−20.56	+0.37	+0.315	+0.252	-- -- --	-----	----	-----	-----
5	14 54 24	+27.79	+0.16	−0.180	−0.150	15 11 38	+17.77	−0.05	−0.223	−0.261
5	-- -- --	-----	----	-----	-----	15 28 28	+18.21	+0.15	−0.069	−0.085
7	12 45 15	+28.10	+0.45	+0.138	+0.106	12 59 2	+17.06	+0.13	−0.031	−0.040
7	13 23 22	+21.23	+0.77	+0.114	+0.086	13 11 40	+17.87	+0.23	+0.045	+0.046
8	10 51 49	+25.32	+0.24	+0.104	+0.078	11 1 21	+ 7.82	+0.08	−0.117	−0.143
8	11 23 50	+29.94	−0.80	−1.010	−0.825	11 11 4	+ 9.90	+0.15	−0.034	−0.044
8	11 47 45	+27.62	+0.60	+0.252	+0.200	11 57 15	+17.03	+0.26	+0.098	+0.106
8	12 30 4	+18.12	+1.38	+0.622	+0.500	12 12 59	+18.18	+0.12	−0.076	−0.093
10	12 57 6	−29.65	+0.91	+0.305	+0.243	13 10 12	−13.41	+0.47	−0.056	−0.069
10	13 28 55	−28.95	+0.19	−0.080	−0.067	13 20 13	−15.14	+0.50	+0.030	+0.031
12	12 8 18	−20.25	+0.17	+0.127	+0.100	12 30 1	−17.62	+0.20	−0.009	−0.015
13	10 59 23	−21.94	0.00	−0.051	−0.046	11 11 36	−18.67	+0.24	+0.011	+0.011
13	-- -- --	-----	----	-----	-----	11 19 41	−18.31	+0.28	+0.045	+0.049
14	11 55 46	+21.15	+0.18	+0.051	+0.033	12 7 18	+ 3.19	+0.23	−0.001	−0.008
14	12 26 35	+27.82	+0.16	+0.011	+0.002	12 15 40	+ 5.20	+0.29	+0.071	+0.075
17	13 5 13	−28.44	+0.76	−0.004	−0.008	13 20 0	−10.95	+0.47	−0.122	−0.148
17	13 54 9	−29.18	+0.36	+0.134	+0.106	13 36 30	−14.31	+0.66	+0.157	+0.176
18	11 39 25	−23.66	+0.91	−0.113	−0.100	11 48 25	− 4.89	+1.19	+0.486	+0.549
18	12 9 16	−29.08	+0.44	−0.241	−0.202	11 56 12	− 6.21	+0.60	−0.083	−0.105
18	13 21 24	−22.72	−0.48	−0.534	−0.436	13 30 36	−18.70	+0.17	−0.074	−0.085
18	13 56 26	−13.22	+1.40	+1.374	+1.111	13 39 33	−18.70	+0.38	+0.155	+0.176
21	9 59 27	−26.34	−0.08	−0.187	−0.157	10 12 16	−18.74	+0.47	+0.195	+0.223
21	10 30 41	−18.13	−0.01	−0.023	−0.024	10 21 2	−18.76	+0.35	+0.101	+0.114
22	11 29 53	+25.40	+0.15	+0.018	+0.009	11 41 24	+ 6.30	+0.48	+0.268	+0.302
22	12 0 26	+29.43	+0.31	+0.125	+0.095	11 49 46	+ 8.52	+0.16	−0.039	−0.049
24	10 29 23	+28.03	+0.26	−0.115	−0.098	10 39 12	+16.95	+0.25	+0.081	+0.086
24	11 3 49	+19.83	+0.91	+0.200	+0.156	10 52 38	+17.81	+0.20	+0.004	−0.001
25	12 45 20	−30.03	+0.25	−0.235	−0.195	13 1 2	−14.57	+0.51	+0.044	+0.046
25	13 42 32	−23.15	+0.17	+0.134	+0.106	13 19 48	−16.92	+0.41	+0.044	+0.047
30	10 59 40	+27.67	−0.39	−0.526	−0.433	11 10 2	+ 8.19	+0.18	−0.015	−0.022
30	11 29 58	+29.33	+0.16	−0.059	−0.054	11 18 57	+10.20	0.00	−0.181	−0.214
Oct. 2	9 45 51	+27.66	+0.19	−0.151	−0.128	9 59 41	+16.67	−0.15	−0.315	−0.366
2	10 29 38	+17.23	+0.68	−0.053	−0.048	10 13 3	+16.94	+0.35	+0.159	+0.177
4	10 19 31	−23.98	+0.97	+0.037	+0.024	10 35 0	− 5.54	+0.72	+0.081	+0.084
4	11 10 34	−29.09	+0.13	−0.223	−0.185	10 51 9	− 8.76	+0.43	−0.150	−0.182
5	10 4 9	−29.25	+0.41	+0.018	+0.012	10 19 49	−14.12	+0.40	−0.025	−0.032
5	11 26 11	−12.74	+0.03	+0.045	+0.033	10 37 48	−16.51	+0.71	+0.375	+0.428
6	8 47 24	−28.32	+0.21	−0.337	−0.280	9 1 47	−11.55	+0.42	−0.082	−0.099
6	9 30 56	−26.30	−0.19	−0.313	−0.256	9 16 20	−13.75	+0.29	−0.137	−0.163
7	12 37 39	+22.22	+0.23	−0.312	−0.258	12 50 18	+16.74	+0.14	−0.072	−0.087
7	-- -- --	-----	----	-----	-----	13 7 9	+16.00	+0.51	+0.230	+0.260
8	8 28 33	− 8.70	−0.18	−0.247	−0.206	8 39 19	−14.70	+0.31	+0.124	+0.139
9	10 4 20	+26.71	+0.37	+0.068	+0.052	10 17 59	+15.31	+0.01	−0.143	−0.168
9	10 41 22	+19.53	+0.40	−0.217	−0.181	10 28 50	+15.91	+0.20	+0.033	+0.033
9	12 45 46	−23.47	+1.16	+0.260	+0.205	13 5 25	− 6.03	+0.81	+0.202	+0.223
9	13 43 40	−28.16	+0.30	+0.031	+0.021	13 25 23	− 9.64	+0.35	−0.182	−0.215
16	10 2 4	+26.72	−0.09	−0.259	−0.215	10 13 54	+10.65	+0.55	+0.404	+0.460
16	10 31 31	+24.96	+0.06	−0.257	−0.211	10 23 54	+12.41	+0.18	+0.040	+0.043

[1] Corrected for light time.

Deimos

Date	W. M. T.[1]	Obs. x	dx	v_1	v_2	W. M. T.[1]	Obs. y	dy	v_1	v_2
1909	h m s	″	″	″	″	h m s	″	″	″	″
Aug. 23	14 2 51	+65. 06	−0. 09	−0. 018	−0. 017	14 17 12	+37. 88	−0. 90	−0. 525	−0. 604
23	14 42 23	+63. 23	+0. 71	+0. 807	+0. 656	14 27 9	+38. 23	−0. 45	−0. 082	−0. 092
25	13 26 31	−60. 43	+1. 17	+0. 967	+0. 785	13 39 29	−43. 65	−0. 28	−0. 422	−0. 486
25	14 28 8	−51. 63	−0. 18	−0. 438	−0. 366	13 53 47	−44. 37	+0. 11	−0. 022	−0. 025
26	14 44 38	−54. 62	−0. 98	−0. 782	−0. 641	14 56 27	−15. 55	−0. 19	−0. 362	−0. 418
26	15 24 19	−60. 45	+0. 38	+0. 373	+0. 304	15 13 15	−18. 56	+0. 40	+0. 223	+0. 260
Sept. 7	12 2 13	+33. 62	−0. 09	−0. 264	−0. 221	12 18 15	− 6. 26	−0. 37	−0. 012	−0. 014
7	12 37 49	+40. 48	+0. 52	+0. 377	+0. 304	12 27 38	− 4. 88	−0. 23	+0. 138	+0. 161
10	11 53 13	+22. 01	−0. 26	+0. 040	+0. 025	12 7 54	+38. 92	−0. 17	−0. 128	−0. 148
10	12 40 12	+10. 32	+0. 02	+0. 343	+0. 272	12 17 46	+37. 71	+0. 07	+0. 103	+0. 114
10	13 54 42	− 7. 56	−0. 65	−0. 307	−0. 256	14 13 30	+23. 83	−0. 37	−0. 440	−0. 510
10	14 44 9	−19. 93	−0. 37	−0. 027	−0. 027	14 36 50	+20. 46	−0. 42	−0. 508	−0. 588
10	14 51 56	−22. 06	−0. 10	+0. 240	+0. 193	14 58 35	+16. 97	−0. 24	−0. 343	−0. 395
12	11 17 34	+ 7. 70	+0. 14	−0. 128	−0. 112	10 57 20	−29. 05	−0. 23	−0. 056	−0. 068
12	13 33 8	+39. 50	+0. 12	−0. 035	−0. 032	13 8 48	− 9. 89	+0. 15	+0. 493	+0. 570
12	14 12 40	+47. 60	−0. 05	−0. 171	−0. 143	14 36 5	+ 4. 96	−0. 36	+0. 066	+0. 076
13	10 11 33	−72. 26	+0. 24	+0. 133	+0. 103	10 23 1	−42. 04	+0. 37	+0. 166	+0. 194
13	10 45 22	−70. 50	+0. 24	+0. 085	+0. 063	10 33 27	−42. 85	+0. 36	+0. 159	+0. 186
14	11 7 15	−41. 75	−0. 14	+0. 162	+0. 128	11 16 53	+ 2. 64	+0. 22	+0. 066	+0. 075
14	11 41 2	−48. 38	−0. 20	+0. 076	+0. 058	11 24 59	+ 0. 69	+0. 83	+0. 671	+0. 777
14	13 2 55	−61. 83	−0. 07	+0. 121	+0. 096	13 19 22	−17. 59	+0. 58	+0. 379	+0. 442
17	10 42 37	−17. 63	+0. 40	+0. 073	+0. 050	10 53 12	−37. 80	+0. 02	+0. 093	+0. 106
17	11 12 1	−10. 12	+0. 23	−0. 083	−0. 078	11 2 6	−36. 68	−0. 18	−0. 096	−0. 111
18	10 36 10	−73. 57	+0. 06	+0. 009	+0. 002	10 50 39	−37. 75	0. 00	−0. 217	−0. 247
18	11 17 38	−72. 79	+0. 14	+0. 027	+0. 016	11 7 22	−39. 39	+0. 02	−0. 195	−0. 222
18	14 9 24	−54. 39	+0. 51	+0. 208	+0. 159	14 21 36	−47. 91	+0. 40	+0. 282	+0. 324
18	14 38 12	−48. 90	+0. 26	−0. 060	−0. 058	14 29 40	−47. 61	+0. 22	+0. 110	+0. 126
21	10 45 43	+55. 18	+0. 22	+0. 136	+0. 106	10 56 45	+ 8. 20	−0. 53	−0. 090	−0. 104
21	11 24 1	+61. 32	−0. 01	−0. 062	−0. 056	11 10 41	+10. 12	−0. 21	+0. 239	+0. 276
22	10 26 58	−36. 09	−0. 05	−0. 387	−0. 326	10 35 42	−44. 28	+0. 04	+0. 004	0. 000
22	11 12 59	−25. 93	+0. 40	+0. 066	+0. 044	10 58 52	−42. 78	0. 00	−0. 010	−0. 014
22	12 11 30	−11. 42	+0. 29	−0. 027	−0. 030	12 22 29	−35. 28	−0. 04	+0. 059	+0. 064
22	12 46 14	− 2. 74	+0. 40	+0. 103	+0. 075	12 31 33	−34. 31	−0. 01	+0. 101	+0. 112
24	11 32 1	−17. 69	−0. 55	−0. 238	−0. 201	11 46 52	+19. 33	+0. 53	+0. 437	+0. 502
24	12 15 36	−28. 03	−0. 69	−0. 386	−0. 321	12 1 40	+16. 88	+0. 78	+0. 676	+0. 777
24	13 52 35	−49. 17	−0. 21	+0. 041	+0. 032	14 15 34	− 3. 34	−0. 26	−0. 439	−0. 507
24	14 58 16	−60. 53	+0. 17	+0. 359	+0. 290	14 37 39	− 7. 13	−0. 02	−0. 208	−0. 239
25	14 5 52	+36. 80	−0. 48	−0. 249	−0. 211	-- -- --	-----	----	-----	-----
30	9 46 23	+72. 74	−0. 52	−0. 474	−0. 391	10 3 19	+32. 84	−0. 23	+0. 217	+0. 253
30	10 30 22	+72. 57	−0. 44	−0. 372	−0. 308	10 16 59	+34. 88	−0. 80	−0. 358	−0. 413
30	11 41 30	+68. 83	−0. 35	−0. 245	−0. 205	11 53 6	+42. 31	−0. 25	+0. 120	+0. 140
30	12 12 54	+65. 90	−0. 37	−0. 249	−0. 210	12 1 57	+43. 03	−0. 45	−0. 088	−0. 102
Oct. 2	11 59 14	−42. 91	−0. 04	−0. 253	−0. 215	12 35 35	−42. 65	−0. 53	−0. 590	−0. 684
4	8 50 15	+49. 15	−0. 25	−0. 079	−0. 073	9 17 2	+44. 32	−0. 22	−0. 021	−0. 024
4	9 52 46	+36. 58	+0. 07	+0. 272	+0. 216	9 35 49	+43. 92	−0. 28	−0. 103	−0. 119
4	12 6 50	+ 5. 86	−0. 38	−0. 118	−0. 105	12 28 16	+31. 22	+0. 11	+0. 099	+0. 113
4	-- -- --	-----	----	-----	-----	12 52 41	+28. 37	+0. 19	+0. 157	+0. 179
5	8 47 26	+62. 05	+0. 15	+0. 119	+0. 095	9 8 23	+16. 05	−0. 42	+0. 024	+0. 030
5	9 38 12	+66. 87	+0. 28	+0. 282	+0. 228	9 21 54	+18. 06	−0. 52	−0. 072	−0. 082
7	8 43 49	−69. 73	−0. 28	−0. 351	−0. 291	8 55 53	−32. 69	+0. 05	−0. 163	−0. 185
7	9 20 35	−69. 17	−0. 02	−0. 139	−0. 119	9 7 25	−33. 81	+0. 05	−0. 162	−0. 185
8	9 43 53	−33. 37	−0. 15	+0. 097	+0. 075	9 54 16	+10. 57	+0. 39	+0. 265	+0. 304
8	10 16 12	−39. 83	−0. 28	−0. 047	−0. 043	10 4 20	+ 9. 26	+0. 24	+0. 109	+0. 125
9	8 9 0	+62. 35	+0. 15	+0. 258	+0. 207	8 21 2	+41. 17	−0. 40	−0. 071	−0. 081
9	8 45 10	+58. 17	+0. 14	+0. 265	+0. 210	8 34 15	+41. 72	−0. 39	−0. 072	−0. 083
9	11 10 59	+33. 40	−0. 33	−0. 136	−0. 119	11 26 22	+40. 59	−0. 01	+0. 116	+0. 134
9	12 4 10	+21. 57	−0. 16	+0. 059	+0. 040	11 42 48	+39. 96	−0. 23	−0. 121	−0. 142

[1] Corrected for light time.

Phobos—Normal Equations and Results, first solution

	dE	$e \sin P$	$e \cos P$	$\frac{da}{a}$	$\sin I\ dN$	dI	n
dE	+17336. 24	− 4596. 95	− 1875. 69	− 967. 64	−11321. 70	+14347. 69	−235. 585
$e \sin P$		+83670. 47	− 173. 40	+ 3127. 73	+ 365. 50	− 2510. 47	−906. 535
$e \cos P$			+29303. 89	+ 603. 84	+ 774. 33	− 852. 85	+213. 787
$\frac{da}{a}$				+43967. 41	+ 2136. 20	+ 4273. 97	− 95. 570
$\sin I\ dN$					+22867. 50	−17082. 60	+118. 904
dI						+32921. 35	−174. 272

$[nn] = +23.921$

$dE = +0^r.01899 \pm 0^r.00189$	$dE = +\ 1^\circ.088\ \pm 0^\circ.108$
$e \sin P = +0.01177\ \pm 0.00065$	$P =\ 117^\circ.63$
$e \cos P = -0.00616\ \pm 0.00109$	$e =\ 0.0133$
$\frac{da}{a} = +0.00172\ \pm 0.00091$	$da = +\ 0''.015\ \pm 0''.008$
$\sin I\ dN = +0^r.00362 \pm 0^r.00168$	$dN = +\ 0^\circ.349\ \pm 0^\circ.162$
$dI = -0^r.00059 \pm 0^r.00145$	$dI = -\ 0^\circ.034\ \pm 0^\circ.083$

	Sum of squares of residuals	Number of equations	P. e. of one equation
dx	+5. 959	53	$\pm 0''.240$
dy	+1. 883	56	$\pm 0''.131$
dx and dy	+7. 842	109	$\pm 0''.186$

Phobos—Normal Equations and Results, second solution

	dE	$e \sin P$	$e \cos P$	$\frac{da}{a}$	$\sin I\ dN$	dI	n
dE	+15479. 50	− 3111. 12	− 1520. 48	+ 2350. 58	−14557. 71	+14012. 04	−209. 989
$e \sin P$		+65563. 46	−11346. 38	+ 2334. 27	+ 277. 18	− 1273. 77	−800. 008
$e \cos P$			+32655. 13	+ 464. 06	+ 1027. 84	− 468. 18	+363. 330
$\frac{da}{a}$				+36525. 89	− 4467. 92	+13979. 19	−106. 664
$\sin I\ dN$					+27638. 16	−20184. 80	+175. 894
dI						+38392. 87	−181. 231

$[nn] = +21.659$

$dE = +0^r.01905 \pm 0^r.00200$	$dE = +\ 1^\circ 092\ \pm 0^\circ.115$
$e \sin P = +0.01194\ \pm 0.00069$	$P =\ 117.58$
$e \cos P = -0.00624\ \pm 0.00097$	$e =\ 0.0135$
$\frac{da}{a} = +0.00170\ \pm 0.00096$	$da = +\ 0''.014\ \pm 0''.008$
$\sin I\ dN = +0^r.00359 \pm 0^r.00154$	$dN = +\ 0^\circ.346\ \pm 0^\circ.149$
$dI = -0^r.00064 \pm 0^r.00122$	$dI = -\ 0^\circ.037\ \pm 0^\circ.070$

	Sum of squares of residuals	Number of equations	P. e. of one equation
dx	+3.942	53	±0″.195
dy	+2.474	56	±0″.150
dx and dy	+6.416	109	±0″.168

Corrected elements of Phobos for Washington Mean Time 1909, September 20.27944, corrected for light time.

From first solution	From second solution
$E=$ 87°.609	$E=$ 87°.613
$P=$117°.63	$P=$117°.58
$e=$ 0.0133	$e=$ 0.0135
$a=$ 8″.506	$a=$ 8″.505
$N=$ 48°.136	$N=$ 48°.133
$I=$ 36°.454	$I=$ 36°.451

Deimos—Normal Equations and Results, first solution

	dE	$2e \sin P$	$e \cos P$	$\frac{da}{a}$	$\sin I\ dN$	dI	n
dE	+210570.33	+ 25034.65	− 5619.52	− 1.44	− 70781.14	+ 73596.84	+273.280
$2e \sin P$		+221251.83	− 18277.63	+ 8554.37	− 7431.25	+ 3625.95	+193.003
$e \cos P$			+147350.57	− 4143.10	+ 10739.61	+ 1063.09	−214.981
$\frac{da}{a}$				+189877.33	+ 48152.25	+ 35589.10	−290.158
$\sin I\ dN$					+183694.88	− 10146.81	+663.889
dI						+171732.35	+ 30.798

$[nn]=+14.968$

$dE=-0^r.00318\pm0^r.00050$	$dE=-\ 0°.182\pm0°.029$
$2e\sin P=-0.00068\ \pm0.00042$	$P=\ 349°.02$
$e\cos P=+0.00176\ \pm0.00051$	$e=\ 0.0018$
$\frac{da}{a}=+0.00301\ \pm0.00048$	$da=+\ 0''.064\ \pm0''.010$
$\sin I\ dN=-0^r.00575\pm0^r.00051$	$dN=-\ 0°.543\ \pm0°.048$
$dI=+0^r.00022\pm0^r.00052$	$dI=+\ 0°.013\ \pm0°.030$

	Sum of squares of residuals	Number of equations	P. e. of one equation
dx	+4.826	56	±0″.210
dy	+4.086	56	±0″.193
dx and dy	+8.912	112	±0″.196

Deimos—Normal Equations and Results, second solution

	dE	$2e \sin P$	$e \cos P$	$\frac{da}{a}$	$\sin I\ dN$	dI	n
dE	+181869. 20	+ 22037. 01	− 9235. 71	− 1643. 75	−113184. 25	+ 47453. 88	− 46. 213
$2e \sin P$		+182675. 73	− 53851. 34	+ 5426. 71	− 13348. 03	+ 1868. 60	+180. 185
$e \cos P$			+161245. 53	− 3076. 49	+ 15624. 20	+ 426. 40	−258. 327
$\frac{da}{a}$				+164313. 47	+ 29814. 30	+ 77756. 05	−338. 615
$\sin I\ dN$					+228148. 60	− 11228. 62	+827. 106
dI						+191921. 55	−189. 453

$[nn] = +14.913$

$dE = -0^r.00319 \pm 0^r.00057$ $\qquad$ $dE = -\ 0°.183 \pm 0°.033$

$2e \sin P = -0.00057 \pm 0.00048$ $\qquad$ $P = 351°.21$

$e \cos P = +0.00184 \pm 0.00051$ $\qquad$ $e = 0.0019$

$\frac{da}{a} = +0.00302 \pm 0.00054$ $\qquad$ $da = +\ 0''.064 \pm 0''.011$

$\sin I\ dN = -0^r.00575 \pm 0^r.00050$ $\qquad$ $dN = -\ 0°.543 \pm 0°.047$

$dI = +0^r.00022 \pm 0^r.00051$ $\qquad$ $dI = +\ 0°.012 \pm 0°.029$

	Sum of squares of residuals	Number of equations	P. e. of one equation
dx	+3. 231	56	±0''. 171
dy	+5. 444	56	±0''. 223
dx and dy	+8. 675	112	±0''. 193

Corrected elements of Deimos for Washington Mean Time 1909, September 20.27944, corrected for light time.

From first solution	From second solution
$E = 66°.724$	$E = 66°.723$
$P = 349°.02$	$P = 351°.21$
$e = 0.0018$	$e = 0.0019$
$a = 21''.310$	$a = 21''.310$
$N = 43°.284$	$N = 43°.284$
$I = 37°.354$	$I = 37°.353$

CORRECTIONS TO ELEMENTS OF THE ORBITS OF THE SATELLITES OF MARS FROM OBSERVATIONS IN 1924

CORRECTIONS TO ELEMENTS OF THE ORBITS OF THE SATELLITES OF MARS FROM OBSERVATIONS IN 1924 MADE WITH THE 26-INCH EQUATORIAL

By ASAPH HALL, ELEANOR A. LAMSON, AND ERNEST CLARE BOWER

From the observations at the 1924 opposition of Mars, made by Professor HALL and Mr. BOWER with the 26-inch equatorial of the United States Naval Observatory, corrections have been determined to the elements of the satellites of Mars as published by H. STRUVE in *Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften,* 1911, s. 1073.

The Washington measures were made in position angle and distance, bisecting the satellite and the illuminated area of the planet, the glare of the planet being reduced by means of a red glass attached to the eyepiece, nearly in the focal plane and covering one-half the field of view. The eyepiece magnifies 360 diameters.

The Repsold micrometer was used and the screw value was taken as $20''.8347+0''.000022\ (T-50°\ F.)$.

In the following tables are given with the W. M. T., corrected for light time, the observed position angle and distance; the usual corrections for motion, differential refraction, phase, etc., having been applied. In the same tables are found the values of *ds* and *sdp,* as well as *v* obtained from the solutions of the observation equations for corrections to the elements referred to above. The formulæ of MARTH [1] have been utilized in computing from STRUVE's elements the places of the satellites, together with the differential coefficients used in the observation equations. The orbits were taken as circular, and independent solutions have been made for the work of the two observers.

[1] Mémoires de l'Académie Impériale des Sciences de St. Pétersbourg, VIII^e Série, Vol. VIII, No. 3, p. 4, and Mémoires de l'Académie Impériale des Sciences de St. Pétersbourg, VII^e Série, Vol. XLII, No. 4, p. 29.

Phobos 1924, Hall

Date	W. M. T.[1]	Observed s	$(O-C)$ $\frac{ds}{n}$	v	Observed p	$(O-C)$ $\frac{sdp}{n}$	v
1924		″	″	″	°	″	″
July	19. 50857	22. 492	−0. 418	−0. 247	239. 374	+0. 276	−0. 132
	23. 61535	30. 160	+0. 141	+0. 199	255. 122	−0. 744	−0. 884
	26. 64683	29. 688	−1. 133	−0. 774	75. 422	−0. 206	+0. 506
	27. 59750	30. 510	−0. 277	−0. 036	77. 008	−0. 616	+0. 133
	28. 53222	26. 893	−0. 006	−0. 077	86. 250	−0. 730	+0. 134
	28. 55479	30. 921	−0. 139	+0. 116	77. 118	−0. 442	+0. 307
	29. 54213	27. 434	−1. 025	−0. 143	63. 533	−0. 996	−0. 384
August	1. 52176	29. 211	+0. 563	+0. 527	265. 918	−0. 095	+0. 014
	8. 52756	26. 902	+0. 073	−0. 059	271. 160	−0. 059	+0. 188
	8. 55357	32. 943	−0. 134	−0. 100	259. 389	−0. 064	−0. 130
	14. 43315	29. 822	+0. 043	+0. 004	85. 948	−1. 151	−0. 243
	14. 45517	33. 371	−0. 722	−0. 400	78. 414	−0. 407	+0. 386
	14. 58970	29. 507	+0. 650	+0. 533	269. 256	−0. 180	+0. 038
	15. 45145	26. 755	−1. 167	−0. 004	61. 259	−0. 774	−0. 135
	15. 53022	23. 105	+0. 567	+0. 279	279. 677	−0. 197	+0. 259
	15. 55244	31. 095	+0. 239	+0. 171	266. 541	−0. 099	+0. 043
	17. 62314	30. 520	+0. 040	+0. 023	85. 088	−1. 434	−0. 532
	18. 46027	33. 346	−0. 152	−0. 112	252. 796	+0. 197	−0. 087
	18. 48261	26. 895	−0. 354	−0. 227	244. 086	+0. 919	+0. 455
	19. 54294	31. 883	−0. 476	−0. 393	83. 458	−0. 913	−0. 043
	19. 56620	34. 091	−0. 483	+0. 082	74. 826	−0. 922	−0. 176
	20. 50577	33. 227	−0. 388	−0. 210	80. 982	−1. 009	−0. 172
	21. 47512	34. 299	−0. 396	+0. 077	76. 066	−1. 251	−0. 483
	26. 42113	34. 422	−0. 086	−0. 080	258. 096	+0. 373	+0. 217
	26. 45029	28. 032	−0. 349	−0. 281	246. 170	+0. 390	−0. 045
	27. 51343	32. 344	+0. 191	+0. 299	84. 981	−0. 806	+0. 055
	28. 47207	32. 048	−0. 511	−0. 070	84. 240	−0. 831	+0. 018
	28. 51175	31. 161	−0. 470	+0. 539	69. 778	−0. 612	+0. 058
	29. 44582	33. 966	−0. 397	+0. 096	78. 023	−0. 872	−0. 108
	29. 47437	29. 119	−0. 701	+0. 146	67. 187	−0. 591	+0. 067
	29. 58342	31. 715	+0. 316	+0. 212	267. 663	−0. 050	+0. 111
	30. 43922	25. 978	−0. 840	+0. 398	63. 020	−0. 521	+0. 136
	30. 52264	25. 349	−0. 109	−0. 387	276. 415	−0. 173	+0. 223
	30. 54309	31. 935	−0. 135	−0. 219	266. 439	−0. 085	+0. 039
September	4. 47487	28. 561	−0. 098	−0. 065	89. 413	−1. 225	−0. 358
	10. 42636	29. 826	+0. 313	+0. 297	253. 421	+0. 708	+0. 393
	24. 40864	25. 856	+0. 087	−0. 065	271. 802	−0. 031	+0. 172
	24. 42864	28. 894	+0. 059	+0. 006	263. 826	+0. 094	+0. 084

[1] Corrected for light time.

Deimos 1924, Hall

Date	W. M. T.[1]	Observed s	$(O-C)$ ds n	v	Observed p	$(O-C)$ sdp n	v
1924		$''$	$''$	$''$	°	$''$	$''$
July	23. 58271	75. 119	+0. 422	+0. 179	253. 959	+0. 047	−0. 267
	27. 51536	55. 107	+0. 999	+0. 060	238. 670	+0. 668	+0. 055
	28. 48987	67. 083	+0. 687	+0. 972	266. 995	+0. 236	+0. 007
August	8. 49820	59. 664	+0. 007	+0. 021	59. 547	−0. 729	−0. 796
	14. 48381	61. 517	−1. 557	−0. 417	92. 786	+0. 301	−0. 069
	14. 50757	67. 937	−1. 192	−0. 141	89. 602	+0. 224	−0. 076
	14. 54186	75. 272	−1. 170	−0. 263	85. 839	+0. 136	−0. 087
	15. 47687	49. 646	+0. 619	−0. 535	234. 554	+0. 726	−0. 070
	15. 50161	42. 082	+0. 779	−0. 366	227. 968	+0. 890	−0. 064
	17. 55526	38. 448	−0. 247	+0. 180	293. 159	+0. 968	+0. 710
	17. 59031	49. 217	−0. 463	−0. 094	282. 113	+0. 726	+0. 495
	18. 51970	78. 211	+0. 397	+0. 586	70. 510	+0. 406	+0. 347
	18. 54516	73. 013	+0. 333	+0. 455	67. 545	−0. 120	−0. 178
	19. 48665	49. 198	−1. 954	−0. 674	100. 957	+0. 443	−0. 114
	19. 51258	57. 126	−1. 859	−0. 643	95. 972	+0. 442	+0. 006
	20. 54645	42. 208	+0. 589	−0. 579	228. 740	+0. 602	−0. 347
	21. 54868	86. 299	+0. 335	+0. 323	260. 756	+0. 084	−0. 173
	21. 59403	86. 981	+0. 421	+0. 174	257. 527	+0. 423	+0. 124
	26. 48838	69. 093	−0. 199	+0. 119	271. 352	+0. 388	+0. 185
	26. 52174	76. 633	+0. 058	+0. 306	267. 713	+0. 279	+0. 069
	28. 43373	78. 695	−1. 083	−0. 230	85. 629	−0. 429	−0. 628
	28. 56407	83. 581	−0. 195	+0. 135	75. 580	−0. 262	−0. 336
	29. 51480	30. 630	−0. 982	+0. 188	124. 552	+0. 682	−0. 389
	29. 55062	41. 028	−1. 412	−0. 108	108. 982	+0. 425	−0. 301
	29. 61801	61. 150	−1. 588	−0. 415	94. 819	+0. 355	−0. 028
	30. 46238	83. 419	+0. 727	+0. 251	256. 280	+1. 076	+0. 742
	30. 48968	79. 324	+0. 294	−0. 343	253. 611	+0. 513	+0. 135
September	4. 42448	83. 598	+0. 266	+0. 236	262. 769	+0. 241	+0. 006
	9. 50349	82. 054	+0. 336	+0. 150	261. 288	+0. 820	+0. 565
	23. 38833	73. 328	+0. 098	−0. 080	261. 563	+0. 400	+0. 158
	23. 42795	71. 353	−0. 084	−0. 448	258. 210	+0. 216	−0. 068

[1] Corrected for light time.

Phobos 1924, Bower

Date	W. M. T.[1]	Observed s	$(O-C)$ $\frac{ds}{n}$	v	Observed p	$(O-C)$ $\frac{sdp}{n}$	v
1924		″	″	″	°	″	″
July	25. 54232	29. 782	−0. 195	−0. 151	250. 695	−0. 282	−0. 571
	25. 55727	27. 212	−0. 050	−0. 116	244. 584	−0. 053	−0. 401
	26. 52283	------	------	-----	241. 153	+0. 497	+0. 114
	29. 51817	30. 398	−1. 120	−0. 414	73. 605	−0. 973	+0. 287
August	4. 45196	26. 229	−0. 131	−0. 257	242. 212	+0. 737	+0. 342
	4. 53594	24. 005	−0. 093	−0. 063	91. 305	−1. 478	−0. 454
	4. 54881	27. 999	−0. 558	−0. 443	84. 159	−1. 571	−0. 437
	4. 56817	31. 489	−0. 923	−0. 413	76. 684	−1. 322	−0. 071
	4. 59308	30. 324	−1. 008	+0. 171	67. 283	−1. 180	+0. 172
	4. 60592	26. 942	−1. 241	+0. 170	61. 670	−0. 952	+0. 443
	5. 52300	31. 686	−0. 718	−0. 248	77. 560	−1. 252	−0. 006
	5. 54420	31. 070	−1. 272	−0. 220	69. 428	−1. 300	+0. 037
	5. 55480	29. 138	−1. 300	0. 000	65. 015	−1. 248	+0. 126
	5. 56844	24. 902	−1. 465	+0. 009	57. 478	−1. 387	+0. 036
	6. 45635	26. 827	−0. 212	−0. 149	87. 179	−1. 512	−0. 420
	6. 47409	31. 244	−0. 520	−0. 179	79. 372	−1. 474	−0. 257
	6. 49047	32. 250	−0. 935	−0. 161	73. 963	−1. 028	+0. 273
	6. 50517	30. 562	−1. 306	−0. 133	67. 389	−1. 504	−0. 147
	6. 51768	27. 451	−1. 465	−0. 048	61. 243	−1. 673	−0. 272
	6. 52871	23. 723	−1. 410	+0. 084	54. 749	−1. 580	−0. 135
	6. 61646	27. 599	+0. 303	+0. 328	270. 981	+0. 461	+0. 374
	6. 62568	30. 177	+0. 103	+0. 237	266. 275	+0. 455	+0. 311
	23. 50335	24. 137	+0. 460	+0. 114	280. 023	+0. 312	+0. 407
	23. 51688	29. 573	+0. 506	+0. 448	271. 644	+0. 392	+0. 342
	26. 58010	34. 189	−0. 329	+0. 656	75. 306	−1. 419	−0. 116
	26. 58803	33. 323	−0. 510	+0. 708	72. 586	−1. 295	+0. 053

[1] Corrected for light time.

Deimos 1924, Bower

Date	W. M. T.[1]	Observed s	$(O-C)$ $\frac{ds}{n}$	v	Observed p	$(O-C)$ $\frac{sdp}{n}$	v
1924		″	″	″	°	″	″
July	16. 60534	70. 270	−0. 330	+0. 178	77. 232	+0. 419	+0. 491
	19. 55395	------	-----	-----	285. 629	+0. 560	+0. 112
	25. 57376	64. 423	+0. 358	+0. 270	64. 939	+0. 388	+0. 237
	25. 59668	59. 434	+0. 156	−0. 029	61. 685	+0. 005	−0. 213
	26. 60498	65. 299	−1. 705	−0. 592	86. 014	+0. 164	+0. 220
August	4. 47526	75. 967	−1. 185	−0. 208	82. 218	−0. 349	−0. 239
	4. 50118	79. 107	−0. 923	−0. 101	79. 718	−0. 707	−0. 590
	4. 51794	80. 166	−1. 084	−0. 360	78. 642	−0. 278	−0. 165
	4. 63058	75. 727	+0. 330	+0. 405	69. 142	−0. 008	−0. 061
	5. 60772	46. 472	−1. 745	−0. 049	100. 576	+0. 215	−0. 097
	6. 43449	83. 768	+0. 790	+0. 960	257. 612	+0. 791	+0. 406
	6. 55296	72. 483	+0. 955	+0. 037	247. 249	+0. 652	−0. 105
	6. 57227	68. 351	+0. 935	−0. 123	245. 268	+0. 856	+0. 012
	6. 58701	64. 678	+0. 750	−0. 402	243. 485	+0. 908	−0. 009
	6. 60067	61. 185	+0. 729	−0. 495	241. 455	+0. 754	−0. 236
	23. 48526	86. 016	−0. 548	−0. 027	77. 260	−0. 494	−0. 386
	26. 61299	86. 479	+0. 057	+0. 229	260. 494	+0. 766	+0. 449
	26. 62872	86. 474	−0. 006	+0. 011	259. 160	+0. 540	+0. 188

[1] Corrected for light time.

To investigate a possible systematic error in the observations due to the position of the satellite with reference to the planet, the values of ds and dp in the sense $(O—C)$ were tabulated with $(p—Q)$, where p is the observed position angle of the satellite and Q is the position angle of the radius of the planet's disk which passes through the point of greatest defect of illumination. Generally speaking, the mean of four observations was used for each tabular quantity.

Deimos

Hall					Bower				
p	Q	$p-Q$	ds	dp	p	Q	$p-Q$	ds	dp
		°	″	°			°	″	°
E	W	−219	−0. 771	+0. 28	E	W	−190	−0. 233	−0. 07
E	W	−196	−0. 978	−0. 04	E	W	−174	−1. 241	+0. 12
W	W	− 65	+0. 549	+0. 65	W	W	− 19	+0. 832	+0. 66
W	W	− 5	+0. 280	+0. 64	E	E	+ 14	−0. 548	−0. 33
E	E	+ 70	−1. 052	+0. 33	W	E	+196	+0. 026	+0. 43
W	E	+204	+0. 154	+0. 31					
W	E	+239	+0. 226	+0. 41					
Mean { East			−0. 943	+0. 20	Mean { East			−0. 668	−0. 02
Mean { West			+0. 313	+0. 52	Mean { West			+0. 601	+0. 63

Phobos

Hall					Bower				
p	Q	$p-Q$	ds	dp	p	Q	$p-Q$	ds	dp
		°	″	°			°	″	°
E	W	−234	−0. 436	−1. 73	E	W	−206	−1. 395	−2. 97
E	W	−208	−0. 451	−1. 80	E	W	−198	−1. 222	−2. 38
E	W	−183	−0. 516	−1. 18	E	W	−188	−0. 774	−2. 25
W	W	− 30	−0. 007	+0. 48	E	W	−179	−0. 496	−2. 91
W	W	− 2	+0. 242	−0. 47	W	W	− 42	+0. 196	+0. 83
E	E	+ 39	−0. 527	−1. 45	W	W	− 1	+0. 070	+0. 43
E	E	+ 58	−0. 239	−1. 45	E	E	+ 62	−0. 420	−2. 28
W	E	+210	+0. 081	+0. 34					
W	E	+240	−0. 057	+0. 23					
Mean { East			−0. 448	−1. 51	Mean { East			−0. 910	−2. 59
Mean { West			+0. 071	+0. 13	Mean { West			+0. 142	+0. 68

An inspection of these results would seem to indicate that the observed distances and position angles are too small when the satellite is observed in eastern elongation and too large when observed in western elongation. No attempt has been made to correct the observations for this peculiarity.

The corrections to STRUVE's elements obtained from the measures made at Washington in 1924 follow:

Deimos (equator)

Hall	Bower
Mean epoch of observation = 1924.42593 W. M. T.	Mean epoch of observation = 1924.38593 W. M. T.
$dl = -0^\circ.659 \pm 0^\circ.060$	$dl = -1^\circ.169 \pm 0^\circ.110$
$dN = -0^\circ.084 \pm 0^\circ.043$	$dN = -0^\circ.488 \pm 0^\circ.068$
$dI = +0^\circ.002 \pm 0^\circ.056$	$dI = -0^\circ.135 \pm 0^\circ.082$
$\frac{da}{a} = -0.00200 \pm 0.00072$	$\frac{da}{a} = -0.00401 \pm 0.00087$
$da = -0''.065 \pm 0''.023$	$da = -0''.130 \pm 0''.028$
$a = 32''.308$	$a = 32''.243$
$\pi = 352^\circ.4$	$\pi = 319^\circ.8$
$e = 0.00430$	$e = 0.00599$
Probable error of one equation = $\pm 0''.255$	Probable error of one equation = $\pm 0''.240$

Phobos (equator)

Hall	Bower
Mean epoch of observation = 1924.41593 W. M. T.	Mean epoch of observation = 1924.38593 W. M. T.
$dl = +1^\circ.086 \pm 0^\circ.142$	$dl = +1^\circ.048 \pm 0^\circ.187$
$dN = -0^\circ.608 \pm 0^\circ.079$	$dN = -0^\circ.797 \pm 0^\circ.120$
$dI = -0^\circ.647 \pm 0^\circ.133$	$dI = +0^\circ.218 \pm 0^\circ.159$
$\frac{da}{a} = -0.00724 \pm 0.00108$	$\frac{da}{a} = -0.01317 \pm 0.00162$
$da = -0''.094 \pm 0''.014$	$da = -0''.170 \pm 0''.021$
$a = 12''.844$	$a = 12''.768$
$\pi = 307^\circ.3$	$\pi = 307^\circ.6$
$e = 0.02141$	$e = 0.03645$
Probable error of one equation = $\pm 0''.194$	Probable error of one equation = $\pm 0''.214$

Neglecting the secular terms, the corrections to the mean daily motions of the satellites derived from the values of *dl* are as follows:

Deimos		Phobos	
Hall	$= -0^\circ.000060$	Hall	$= +0^\circ.000099$
Bower	$= -0^\circ.000107$	Bower	$= +0^\circ.000096$

The assumed reciprocal of the mass of Mars was $\mu_0 = 3090000$. The change in μ_0 corresponding to $\frac{da}{a}$ as found from the observation equations is

$$d\mu_0 = -3\,\mu_0\,\frac{da}{a}$$

The results from the solutions are:

Deimos		Phobos	
	$d\mu_0$		$d\mu_0$
Hall	$= +18540$	Hall	$= +67115$
Bower	$= +37173$	Bower	$= +122086$

SATELLITES OF SATURN, 1909-1916
ORBITS OF TETHYS, DIONE
RHEA, AND TITAN

SATELLITES OF SATURN, 1909-1916

ORBITS OF TETHYS, DIONE, RHEA, AND TITAN

By ASAPH HALL

The computed rectangular coordinates of the four pairs of satellites of Saturn—Tethys-Dione, Tethys-Rhea, Dione-Rhea, Rhea-Titan—for the times of observation at the Naval Observatory, 1909–1916, and the differential coefficients for correcting the assumed elements were computed in the Nautical Almanac Office and as so computed were employed for this discussion.

Of the pairs treated in this discussion the Almanac Office solved observation equations as follows for 12 unknown quantities: Dione-Tethys, 1914–15; Rhea-Tethys, 1914–15; Rhea-Dione, 1914–15; Titan-Rhea, 1914–15.

A considerable number of sets of observation equations were solved in the computing section under the direction of Miss ELEANOR A. LAMSON.

The following assumed elements were furnished by the Almanac Office:

Equator and Rings.—Mean equinox and ecliptic of 1889.25 Gr. M. T.:

$\Omega_1 = 167° \; 57'.0$

$i_1 = 28° \; 5'.6$

TETHYS

Epoch of t, 1889.250 Gr. M. T.

Mean equinox and ecliptic of 1889.250 Gr. M. T. and equator of Saturn:

$\gamma = 1° \; 4'.36$

$\Theta = 110°.55 - 72°.5 \times t$

Mean equinox and ecliptic of 1889.250+t Gr. M. T. and equator of Saturn:

$e = 0$

$E_0 = 284° \; 31'.0$ epoch 1889, April 0.0, Gr. M. T.

$n = 190°.69795$

$\delta l = +1°.982 \sin (5°.0745 \times t') + 0°.034 \sin (15°.2235 \times t')$

Epoch of t' 1866.30 Gr. M. T.

$a = 42''.586$

DIONE

Epoch of t, 1889.250 Gr. M. T.

Mean equinox and ecliptic of 1889.250 Gr. M. T. and equator of Saturn:

$\gamma = 4'.0$

$\Theta = 276° - 31°.0 \times t.$

Mean equinox and ecliptic of 1889.250+t Gr. M. T. and equator of Saturn:

$e = 0.0020$

$\pi = 165° + 31°.0 \times t.$

For comparison with observations the orbit was taken as circular.

Epoch 1889, April 0.0, Gr. M. T.

$E_0 = 253° \; 51'.4$

$n = 131°.534955$

$\delta l = -1'.206 \sin (143° + 92°.4 \times t) - 2'.131 \sin (75° + 29°.3 \times t)$

$a = 54''.543$

RHEA

Epoch of t, 1889.25 Gr. M. T.

Mean equinox and ecliptic of 1889.25 Gr. M. T.:

$$(\Omega-167°\ 57'.0)\ \sin\ (28°\ 5'.6)=19'.77\ \sin\ (347°.3-10°.1\times t)-0'.38+1'.00\ \sin\ (48°.5-0°.50\times t)$$

$$i-28°\ 5'.6=19'.77\ \cos\ (347°.3-10°.1\times t)-2'.79+1'.00\ \cos\ (48°.5-0°.50\times t)$$

Mean equinox and ecliptic of 1889.25+t Gr. M. T.:

$$e=0.0009$$

$$\pi=305°+10°.1\times t$$

For comparison with observations the orbit was taken as circular.

Epoch 1889, April 0.0, Gr. M. T.

$$E_0=358°\ 23'.8$$
$$n=79°.690087$$
$$\delta E=+4'.95\ \sin\ (347°.3-10°.1\times t)$$
$$a=76''.170$$

TITAN

Epoch of t, 1890.0 Gr. M. T.

Mean equinox and ecliptic of 1890.0 Gr. M. T.:

$$\Omega=167°\ 51'.2+35'.84\ \sin\ (47°.8-0°.506\times t)+1'.87\ \sin\ (2l_0-2\theta_0+4°\ 38')$$

$$i=27°\ 28'.4+16'.88\ \cos\ (47°.8-0°.506\times t)+0'.87\ \cos\ (2l_0-2\theta_0+4°\ 38')$$

Mean equinox and ecliptic of 1890.0+t Gr. M. T.:

$$e=0.02886+0.000186\ (\cos\ 2g_0-\cos\ 2g)+0.000080\ \cos\ (2l_0-2P)$$

$$\pi=276°\ 15'+31'.7\times t+22'.0\ (\sin\ 2g-\sin\ 2g_0)+9'.6\ \sin\ (2l_0-2P$$

$$g=\pi-\Omega-4°\ 38'$$

Epoch 1890, January 0.0, Gr. M. T.

$$E_0=260°\ 24'.93$$

$$365.25\times n=22\times 360°+326°.25268$$

$$\delta E=+4'.05\ \sin\ (47°.8-0°.51\times t)-0'.857\ \sin\ (l_0-P_0)-0'.036\ \sin\ (2l_0-2P_0)$$
$$-0'.012\ \sin\ (2l_0-2P)-0'.596\ \sin\ (2l_0-2\theta_0)$$

in which

l_0=mean Saturnocentric longitude of the Sun,
P_0=mean Saturnocentric longitude of the perisaturnium of the Sun,
P=mean Saturnocentric longitude of the perisaturnium of the satellite,
θ_0=mean Saturnocentric longitude of the ascending node of the orbit of the satellite on the orbit of Saturn

These longitudes are measured on the ecliptic and orbit of Saturn and (in case of P) the orbit of the satellite.

$$a=176''.578.$$

Log Δ of Saturn =0.97950, corresponding to the values of a as written.

The formulas for computing the derivatives with respect to the elements are as follows:

For inner satellites, e assumed zero—

$$\frac{dx}{d\epsilon}=+\nu\ \cos\ (\epsilon-U)$$

$$\frac{dx}{e\ \sin\ \pi_0}=-\nu\ \cos\ (\epsilon-U)\ \cos\ (\epsilon-\Delta\pi)-\nu\ \cos\ (U-\Delta\pi)$$

$$\frac{dx}{e\ \cos\ \pi_0}=+\nu\ \cos\ (\epsilon-U)\ \sin\ (\epsilon-\Delta\pi)+\nu\ \sin\ (U-\Delta\pi)$$

$$a\frac{dx}{da}=+x$$

$$\frac{dy}{d\epsilon}=-x\ \sin\ B+\nu\ \sin\ \gamma\ \cos\ B\ \cos\ (\epsilon-\theta)$$

$$\frac{dy}{e \sin \pi_0} = -\frac{dy}{d\epsilon} \cdot \cos(\epsilon - \Delta\pi) - \nu \sin(U - \Delta\pi) \sin B - \nu \sin\gamma \cos B \cos(\theta - \Delta\pi)$$

$$\frac{dy}{e \cos \pi_0} = +\frac{dy}{d\epsilon} \cdot \sin(\epsilon - \Delta\pi) - \nu \cos(U - \Delta\pi) \sin B + \nu \sin\gamma \cos B \sin(\theta - \Delta\pi)$$

$$\frac{dy}{d(\gamma \sin \theta_0)} = -\nu \cos B \cos(\epsilon - \Delta\theta)$$

$$\frac{dy}{d(\gamma \cos \theta_0)} = +\nu \cos B \sin(\epsilon - \Delta\theta)$$

$$a\frac{dy}{da} = +y$$

For Titan, $e = \sin \phi$—

$$\frac{dx}{d\pi} = +r\nu \cos(\epsilon - U)$$

$$\frac{dx}{dM} = +\frac{1}{r \cos \phi} \cdot \frac{dx}{d\pi} + \nu \cos(\pi - U) \tan \phi$$

$$\frac{dx}{de} = +\sec^2 \phi \sin(\epsilon - \pi) \cdot \frac{dx}{d\pi} - \nu \sin(\pi - U)$$

$$a\frac{dx}{da} = +x$$

$$\frac{dy}{d\pi} = -x \sin B + r\nu \sin\gamma \cos B \cos(\epsilon - \theta)$$

$$\frac{dy}{dM} = +\frac{1}{r \cos \phi} \cdot \frac{dy}{d\pi} - \nu \sin(\pi - U) \sin B \tan \phi + \nu \sin\gamma \cos B \cos(\pi - \theta) \tan \phi$$

$$\frac{dy}{de} = +\sec^2 \phi \sin(\epsilon - \pi) \cdot \frac{dy}{d\pi} - \nu \cos(\pi - U) \sin B - \nu \sin\gamma \cos B \sin(\pi - \theta)$$

$$\frac{dy}{d(\gamma \sin \theta_0)} = -r\nu \cos B \cos(\epsilon - \Delta\theta)$$

$$\frac{dy}{d(\gamma \cos \theta_0)} = +r\nu \cos B \sin(\epsilon - \Delta\theta)$$

$$a\frac{dy}{da} = +y.$$

The assumed elements are based on formulas and data given by H. Struve in *Supplément I aux Observations de Poulkova;* and *Série II, Volume XI, Publications de Poulkova;* with modifications for Tethys and Titan given in the *Astronomische Nachrichten Nr. 3885 and Nr. 3886.*

References to the above-mentioned publications may be made as follows:

Equator and *rings.*—Volume XI, pages 166, 202.
Tethys.—Volume XI, pages 195, 239; A. N., Nr. 3886.
Dione.—Volume XI, pages 183, 228, 239.
Rhea.—Volume XI, pages 176, 239.
Titan.—Supplément I, page 90; Volume XI, pages 172, 239; A. N., Nr. 3885.

For the derivatives see Volume XI, pages 58, 59. In the case of the derivatives for Titan certain transformations have been made which are indicated in the translation into English by Davis of the *Theoria Motus,* pages 9, 17.

There follow the observation equations, the normals, and the corrections to the assumed elements resulting from the solutions of the normals for the four pairs of Saturn's satellites under discussion.

1757—29——19

Observation Equations in x

TITAN$_6$—RHEA$_5$

Date	$d\pi_6$	dM_6	de_6	$\left(\frac{da}{a}\right)_6$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$\left(\frac{da}{a}\right)_5$	$\frac{C-O}{n}$	v_{11}	v_{12}
1909									″	″	″
Oct. 20	− 6.40	− 6.30	+201.78	+207.18	−38.68	−65.46	+ 88.04	+77.81	−0.02	+0.22	----
20	− 9.80	− 9.61	+202.10	+207.04	−43.37	−69.66	+ 91.32	+75.30	− .24	+ .00	----
25	−184.03	−186.34	+371.16	− 75.56	−79.12	−81.68	+140.11	+35.48	+ .17	+ .09	----
25	−183.20	−185.56	+369.64	− 77.46	−80.36	−80.38	+142.94	+32.61	+ .04	− .05	----
25	−181.26	−183.69	+366.22	− 81.48	−82.62	−76.92	+148.60	+26.35	+ .21	+ .11	----
25	−180.80	−183.27	+365.42	− 82.43	−83.08	−75.96	+149.86	+24.84	+ .13	+ .02	----
26	−137.82	−140.86	+297.14	−140.67	−49.59	+ 1.37	+122.04	−71.12	+ .28	+ .06	----
26	−135.52	−138.58	+293.90	−142.81	−45.67	+ 0.98	+117.35	−73.70	+ .18	− .04	----
26	−134.57	−137.60	+292.62	−143.67	−44.04	+ 0.70	+115.48	−74.68	+ .12	− .10	----
26	−132.10	−135.11	+289.32	−145.84	−39.76	− 0.44	+110.72	−77.04	+ .20	− .02	----
27	− 65.22	− 67.11	+222.50	−184.31	+65.14	−84.65	+114.34	−57.21	+ .44	+ .02	----
27	− 64.43	− 66.30	+221.97	−184.58	+65.95	−84.89	+115.56	−56.28	+ .28	− .14	----
27	− 64.09	− 65.95	+221.75	−184.70	+66.30	−85.00	+116.09	−55.87	+ .39	− .04	----
27	− 63.05	− 64.88	+221.08	−185.04	+67.32	−85.21	+117.66	−54.64	+ .46	+ .03	----
27	− 62.47	− 64.28	+220.72	−185.23	+67.88	−85.32	+118.56	−53.94	+ .49	+ .06	----
27	− 60.77	− 62.55	+219.65	−185.78	+69.50	−85.52	+121.22	−51.83	+ .33	− .10	----
29	+ 87.98	+ 90.34	+240.45	−174.52	−33.36	−61.64	+ 83.86	+79.87	+ .03	− .14	----
29	+ 88.88	+ 91.25	+241.26	−174.07	−34.73	−62.96	+ 84.54	+79.29	+ .37	+ .20	----
29	+ 89.66	+ 92.05	+241.96	−173.69	−35.88	−64.08	+ 85.14	+78.78	+ .30	+ .12	----
29	+ 90.46	+ 92.89	+242.71	−173.28	−37.11	−65.24	+ 85.84	+78.20	+ .24	+ .06	----
29	+ 98.46	+101.03	+250.39	−168.98	−48.80	−75.47	+ 94.56	+71.49	+ .31	+ .13	----
29	+ 99.76	+102.34	+251.70	−168.24	−50.57	−76.83	+ 96.24	+70.24	+ .12	− .07	----
29	+100.50	+103.10	+252.46	−167.81	−51.60	−77.59	+ 97.24	+69.48	+ .22	+ .03	----
29	+102.40	+105.02	+254.41	−166.69	−54.20	−79.41	+ 99.98	+67.47	+ .12	− .07	----
30	+151.64	+154.59	+317.53	−125.28	−84.48	−38.52	+165.57	−18.55	+ .16	− .05	----
30	+153.04	+155.99	+319.72	−123.60	−83.72	−35.26	+165.12	−21.75	+ .23	+ .02	----
31	+191.20	+192.93	+384.50	− 53.61	+ 6.48	−34.86	+ 79.92	−86.23	+ .30	+ .15	----
31	+191.70	+193.38	+385.40	− 51.95	+ 9.08	−37.45	+ 79.51	−85.99	− .09	− .24	----
31	+191.90	+193.55	+385.82	− 51.12	+10.39	−38.75	+ 79.37	−85.84	+ .33	+ .18	----
31	+192.53	+194.14	+386.94	− 49.13	+13.47	−41.86	+ 79.18	−85.41	+ .20	+ .05	----
31	+192.80	+194.40	+387.46	− 48.08	+15.10	−43.52	+ 79.17	−85.14	+ .25	+ .10	----
31	+193.06	+194.63	+387.96	− 47.12	+16.58	−45.02	+ 79.22	−84.87	+ .18	+ .03	----
Nov. 4	+ 60.59	+ 59.03	+217.99	+196.13	−51.20	− 0.50	+123.68	−69.34	+ .05	+ .16	----
4	+ 59.64	+ 58.09	+217.42	+196.44	−49.92	− 0.46	+122.10	−70.26	− .21	− .10	----
4	+ 58.01	+ 56.51	+216.48	+196.93	−47.74	− 0.53	+119.44	−71.76	− .20	− .09	----
4	+ 56.70	+ 55.24	+215.75	+197.31	−45.96	− 0.70	+117.34	−72.92	− .16	− .04	----
6	− 89.34	− 87.08	+238.02	+184.25	+71.56	−12.07	+150.44	+47.87	− .45	− .30	----
6	− 91.20	− 88.92	+239.66	+183.30	+69.70	− 9.98	+147.94	+50.55	− .24	− .08	----
6	− 92.60	− 90.28	+240.91	+182.59	+68.25	− 8.54	+145.99	+52.49	− .16	+ .01	----
6	− 93.71	− 91.38	+241.94	+181.98	+67.00	− 7.44	+144.30	+54.07	+ .07	+ .24	----
16	+191.82	+193.40	+384.54	− 39.85	−37.64	−67.62	+ 83.26	+76.40	− .23	− .24	----
16	+192.26	+193.80	+385.35	− 38.03	−40.15	−69.98	+ 84.32	+75.12	− .30	− .31	----
18	+171.48	+169.34	+345.98	+102.08	− 4.33	−26.33	+ 81.16	−84.89	− .09	− .09	----
18	+170.92	+168.76	+345.03	+103.07	− 2.58	−27.92	+ 80.40	−84.96	+ .09	+ .09	----
18	+170.26	+168.11	+343.87	+104.21	− 0.54	−29.79	+ 79.62	−84.99	− .01	− .01	----
18	+169.70	+167.52	+342.92	+105.19	+ 1.20	−31.42	+ 79.00	−84.99	+ .06	+ .06	----
Dec. 4	+159.44	+157.28	+325.35	+113.01	−32.08	−63.14	+ 77.48	+76.64	− .08	+ .05	----
4	+158.10	+155.87	+323.14	+114.96	−35.44	−66.44	+ 79.10	+75.14	− .24	− .12	----
6	+ 47.25	+ 46.18	+204.66	+191.57	− 9.70	−22.60	+ 81.44	−82.27	− .22	− .12	----
6	+ 45.39	+ 44.36	+203.74	+192.03	− 6.71	−25.10	+ 79.80	−82.57	− .11	− .01	----
8	− 94.60	− 92.12	+234.34	+172.12	+38.42	− 6.38	+105.88	+73.12	− .29	− .06	----
8	− 96.14	− 93.62	+235.81	+171.23	+35.94	− 7.06	+103.18	+74.36	− .25	− .01	----
17	+154.95	+157.92	+315.04	−101.40	+38.90	− 6.70	+105.41	+71.44	+ .18	+ .07	----
20	+153.20	+151.09	+313.79	+112.94	+48.41	−78.04	+ 86.52	−64.84	+ .11	+ .05	----
20	+152.30	+150.16	+312.32	+114.20	+50.30	−79.50	+ 88.42	−63.37	+ .10	+ .03	----
21	+107.82	+105.65	+250.86	+158.17	+76.98	−37.76	+151.28	+24.51	− .08	− .09	----
21	+106.10	+103.94	+248.89	+159.37	+75.92	−34.57	+150.42	+27.63	+ .18	+ .18	----
21	+105.00	+102.85	+247.66	+160.11	+75.20	−32.64	+149.76	+29.54	+ .07	+ .08	----
1910											
Sept. 7	−166.10	−166.62	+347.63	+106.88	−66.54	+40.02	+137.20	−52.09	− .06	− .01	----
7	−167.20	−167.72	+349.14	+105.18	−64.64	+40.66	+134.24	−54.45	− .01	+ .04	----
9	−189.40	−193.88	+354.46	− 41.34	+81.62	+20.67	+163.56	+23.08	+ .15	− .00	----
9	−188.93	−193.44	+353.10	− 43.34	+80.72	+23.24	+161.88	+26.03	+ .04	− .11	----
15	+175.87	+175.40	+363.20	− 88.49	−56.43	−44.40	+122.00	+64.19	− .01	− .06	----
16	+199.25	+196.55	+384.24	− 9.67	−69.50	+38.02	+142.72	−49.95	− .01	− .03	----
16	+199.40	+196.64	+383.88	− 7.52	−67.54	+39.01	+139.60	−52.59	− .04	− .06	----
20	+ 24.65	+ 22.38	+187.71	+203.63	−85.10	−16.38	+169.86	+12.57	− .15	− .05	----
20	+ 22.30	+ 20.10	+187.83	+203.90	−85.56	−12.82	+170.88	+ 8.89	− .01	+ .09	----
22	−120.64	−120.24	+287.96	+163.86	+75.78	−40.18	+151.88	−41.23	− .06	− .17	----
26	−151.53	−156.88	+280.04	−124.64	+38.82	−38.02	+102.88	−77.48	+ .38	+ .13	----
28	− 19.48	− 21.62	+190.45	−194.59	+ 5.88	+ 2.81	+ 87.36	+86.61	+ .20	+ .05	----
Oct. 1	+178.90	+178.58	+369.90	− 90.24	+66.31	−48.40	+135.78	−56.43	+ .23	− .06	----
5	+ 99.50	+ 95.30	+218.43	+182.69	+13.42	−17.37	+ 88.68	−86.31	− .08	− .03	----
10	−200.04	−202.36	+395.86	+ 32.35	+65.51	−50.96	+134.00	−58.26	+ .15	− .01	----
11	−194.40	−198.88	+367.00	− 49.30	+67.82	+35.00	+142.38	+55.62	+ .21	+ .13	----

Observation Equations in y

TITAN$_6$—RHEA$_5$

$d\pi_6$	dM_6	de_6	$d(\gamma \sin \theta)_6$	$d(\gamma \cos \theta)_6$	$\left(\frac{da}{a}\right)_6$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_5$	$\frac{C-O}{n}$	v_{11}	v_{12}
												″	″	″
+40.12	+37.89	−1.35	−194.71	−57.90	+2.23	+14.96	+30.70	+3.33	−84.34	+11.86	+7.68	+0.01	−0.05	----
+40.08	+37.86	−2.00	−195.63	−54.71	+2.88	+14.46	+30.06	+2.53	−83.44	+17.00	+8.58	−.08	−.14	----
−15.33	−16.62	+14.84	+12.35	+194.67	+34.82	+6.57	+20.08	+0.70	−57.80	+62.38	+15.19	−.08	−.01	----
−15.68	−16.69	+15.10	+14.37	+194.50	+34.64	+6.02	+19.54	+0.96	−55.52	+64.42	+15.42	−.20	−.13	----
−16.44	−17.77	+15.66	+18.69	+194.00	+34.26	+4.82	+18.46	+1.64	−50.40	+68.49	+15.83	−.08	−.01	----
−16.62	−17.96	+15.78	+19.72	+193.86	+34.16	+4.53	+18.22	+1.83	−49.14	+69.39	+15.91	+.03	+.10	----
−27.48	−29.18	+19.87	+87.14	+172.35	+25.60	−13.66	+23.63	+16.54	+50.47	+68.40	+9.26	+.02	+.11	----
−27.88	−29.60	+19.82	+89.85	+170.89	+25.15	−14.14	+24.52	+16.46	+54.09	+65.60	+8.50	−.05	+.04	----
−28.04	−29.77	+19.80	+90.94	+170.26	+24.96	−14.32	+24.88	+16.40	+55.52	+64.38	+8.19	+.13	+.22	----
−28.43	−30.18	+19.72	+93.74	+168.67	+24.48	−14.76	+25.76	+16.17	+59.05	+61.16	+7.37	−.18	−.09	----
−35.36	−37.47	+12.44	+150.46	+118.93	+11.51	−10.69	+24.77	+0.24	+73.68	−42.45	−12.51	−.18	−.08	----
−35.40	−37.51	+12.31	+150.95	+118.28	+11.36	−10.51	+24.54	+0.19	+73.06	−43.51	−12.66	−.13	−.03	----
−35.42	−37.53	+12.26	+151.16	+118.00	+11.30	−10.44	+24.44	+0.18	+72.80	−43.94	−12.72	−.19	−.10	----
−35.48	−37.60	+12.09	+151.77	+117.14	+11.10	−10.20	+24.14	+0.14	+71.97	−45.28	−12.91	+.02	+.11	----
−35.51	−37.63	+12.00	+152.16	+116.68	+10.99	−10.06	+23.97	+0.12	+71.50	−46.04	−13.02	−.09	.00	----
−35.61	−37.74	+11.72	+153.20	+115.27	+10.66	−9.66	+23.46	+0.10	+70.05	−48.20	−13.32	+.02	+.11	----
−32.59	−34.56	−13.86	+189.93	−25.96	−17.49	+15.00	+30.34	+4.63	−84.70	+5.68	+6.50	+.15	+.09	----
−32.50	−34.46	−13.98	+189.80	−26.92	−17.65	+14.88	+30.22	+4.38	−84.60	+7.14	+6.76	+.01	−.05	----
−32.43	−34.39	−14.06	+189.70	−27.76	−17.80	+14.78	+30.09	+4.18	−84.48	+8.36	+6.97	−.02	−.08	----
−32.34	−34.30	−14.16	+189.59	−28.64	−17.95	+14.67	+29.95	+3.95	−84.36	+9.68	+7.20	+.03	−.03	----
−31.48	−33.38	−15.03	+188.15	−37.42	−19.44	+13.37	+28.26	+2.06	−81.82	+22.64	+9.39	+.14	+.08	----
−31.33	−33.24	−15.16	+187.90	−38.84	−19.67	+13.13	+27.95	+1.81	−81.22	+24.69	+9.72	−.01	−.07	----
−31.24	−33.15	−15.23	+187.71	−39.66	−19.82	+12.98	+27.74	+1.67	−80.84	+25.89	+9.92	+.10	+.04	----
−31.02	−32.92	−15.42	+187.24	−41.78	−20.17	+12.60	+27.22	+1.33	−79.80	+28.94	+10.40	+.03	−.03	----
−22.91	−24.44	−16.76	+164.74	−100.50	−29.21	−3.71	+14.87	+9.25	−9.60	+84.32	+15.86	−.07	−.16	----
−22.58	−24.11	−16.67	+163.60	−102.35	−29.47	−4.31	+14.96	+9.86	−6.39	+84.62	+15.71	−.06	−.15	----
−9.16	−10.33	−7.85	+111.12	−160.00	−36.24	−16.18	+30.88	+9.77	+82.10	+21.43	−1.44	−.12	−.17	----
−8.85	−10.01	−7.56	+109.75	−161.00	−36.32	−16.12	+30.95	+9.29	+82.70	+18.94	−1.92	−.02	−.07	----
−8.69	−9.84	−7.43	+109.04	−161.47	−36.36	−16.10	+30.97	+9.04	+82.98	+17.68	−2.17	.00	−.05	----
−8.31	−9.46	−7.08	+107.41	−162.67	−36.46	−16.01	+31.00	+8.46	+83.56	+14.68	−2.75	−.04	−.09	----
−8.12	−9.26	−6.90	+106.52	−163.27	−36.51	−15.95	+31.00	+8.15	+83.83	+13.08	−3.05	+.15	+.10	----
−7.93	−9.08	−6.73	+105.72	−163.83	−36.55	−15.90	+30.98	+7.87	+84.04	+11.62	−3.33	+.07	+.02	----
+36.84	+34.81	+12.22	−161.85	−119.98	−10.34	−13.02	+22.28	+16.42	+47.88	+69.76	+9.34	+.01	−.05	----
+36.89	+34.84	+12.06	−162.48	−119.20	−10.16	−13.19	+22.56	+16.42	+49.14	+68.87	+9.10	+.12	+.06	----
+36.98	+34.92	+11.80	−163.46	−117.88	−9.85	−13.46	+23.06	+16.41	+51.24	+67.33	+8.69	−.10	−.16	----
+37.03	+34.99	+11.58	−164.20	−116.80	−9.60	−13.67	+23.44	+16.36	+52.88	+66.04	+8.36	+.10	+.04	----
+33.74	+31.84	−13.26	−199.80	+22.25	+17.46	+9.04	+17.08	+14.40	−21.32	−81.79	−13.12	+.04	+.04	----
+33.55	+31.67	−13.48	−199.53	+24.28	+17.81	+9.54	+17.55	+14.79	−24.41	−80.93	−12.77	−.10	−.10	----
+33.40	+31.52	−13.66	−199.34	+25.78	+18.06	+9.89	+17.91	+15.04	−26.68	−80.22	−12.49	−.05	−.05	----
+33.28	+31.40	−13.78	−199.10	+27.04	+18.26	+10.18	+18.22	+15.24	−28.54	−79.56	−12.26	−.06	−.07	----
−6.29	−7.36	−4.53	+101.52	−163.53	−35.02	+13.74	+28.02	+4.35	−83.10	+9.81	+7.02	+.33	+.22	----
−5.96	−7.03	−4.22	+100.00	−164.53	−35.08	+13.50	+27.74	+3.93	−82.74	+12.56	+7.47	+.13	+.02	----
+19.32	+18.04	+18.46	−35.98	−192.80	−30.52	−15.33	+28.28	+11.86	+77.18	+31.92	+0.56	+.20	+.14	----
+19.49	+18.21	+18.56	−37.08	−192.61	−30.41	−15.34	+28.42	+11.57	+77.82	+30.32	+0.24	+.20	+.14	----
+19.69	+18.41	+18.66	−38.34	−192.35	−30.28	−15.34	+28.55	+11.23	+78.52	+28.44	−0.12	+.14	+.08	----
+19.86	+18.58	+18.76	−39.44	−192.18	−30.17	−15.34	+28.65	+10.94	+79.10	+26.84	−0.44	+.07	+.01	----
+20.83	+19.54	+19.37	−48.12	−186.04	−27.70	+13.46	+27.01	+5.51	−81.58	+4.21	+5.87	+.26	+.15	----
+21.18	+19.87	+19.51	−50.40	−185.49	−27.45	+13.19	+26.71	+4.93	−81.32	+7.82	+6.46	+.15	+.04	----
+34.16	+32.28	+11.25	−159.49	−110.53	−7.41	−14.55	+26.24	+12.69	+72.92	+36.32	+1.50	+.13	+.10	----
+34.23	+32.34	+10.95	−160.55	−108.98	−7.08	−14.60	+26.52	+12.25	+74.18	+33.66	+0.97	+.09	+.06	----
+29.97	+28.27	−11.54	−191.30	+26.48	+17.60	+13.00	+21.80	+15.63	−54.91	−59.86	−6.58	+.10	+.09	----
+29.82	+28.12	−11.72	−191.03	+28.20	+17.86	+13.21	+22.26	+15.50	−56.88	−57.97	−6.15	+.02	+.01	----
−17.14	−18.40	−11.94	+147.74	−106.44	−27.90	+12.70	+21.14	+15.56	−53.30	−59.64	−6.67	+.12	+.04	----
+20.76	+19.49	+19.22	−49.56	−180.47	−26.55	−11.31	+24.06	+2.92	+76.02	−23.49	−8.71	−.15	−.19	----
+20.98	+19.70	+19.31	−51.04	−180.10	−26.38	−11.05	+23.73	+2.67	+75.28	−25.74	−9.04	+.02	−.02	----
+28.54	+26.97	+18.98	−107.10	−154.79	−18.30	+4.53	+12.70	+10.19	+2.62	−79.42	−13.53	+.15	+.08	----
+28.75	+27.16	+18.84	−108.82	−153.64	−17.98	+5.08	+12.86	+10.75	−0.63	−79.46	−13.33	−.06	−.13	----
+28.88	+27.28	+18.76	−109.88	−152.90	−17.79	+5.41	+12.97	+11.09	−2.63	−79.42	−13.20	+.16	+.09	----
+31.81	+29.96	−47.02	−107.05	+154.42	+50.57	−15.77	+35.22	+12.67	+45.48	+66.28	+20.16	−.35	−.21	----
+31.30	+29.46	−46.62	−105.48	+155.50	+50.88	−16.48	+36.12	+12.87	+47.84	+64.62	+19.58	+.03	+.17	----
−13.06	−14.90	−4.93	+32.86	+181.47	+57.06	+6.97	+27.48	+6.96	−17.03	−78.86	−24.68	−.22	−.06	----
−13.67	−15.52	−4.48	+34.78	+181.05	+56.91	+7.86	+27.98	+7.75	−19.88	−78.20	−24.41	−.18	−.02	----
−26.02	−27.84	−41.77	+90.88	−163.90	−53.08	+19.30	+40.39	−12.08	−64.43	+49.68	+16.96	+.04	−.08	----
−2.28	−3.92	−18.32	+16.96	−189.15	−59.79	−15.00	+34.23	+12.79	+43.16	+69.10	+20.87	+.10	−.01	----
−1.64	−3.28	−17.69	+14.93	−189.34	−59.83	−15.79	+35.17	+13.08	+45.80	+67.40	+20.28	+.12	+.01	----
+60.88	+57.58	−25.66	−192.70	−32.07	−6.72	+3.76	+26.35	−3.11	−17.33	+80.08	+25.44	+.03	+.04	----
+60.96	+57.65	−26.37	−193.06	−29.85	−6.02	+2.66	+26.05	−2.04	−13.87	+80.74	+25.58	−.11	−.10	----
+48.44	+45.99	−54.21	−161.25	+107.55	+36.46	−12.30	+31.89	−9.98	+44.04	−69.39	−22.61	−.34	−.17	----
−37.43	−40.01	+5.82	+111.32	+150.20	+44.52	−23.00	+46.58	−8.81	+76.24	−31.76	−11.52	−.27	−.05	----
−57.60	−60.95	−25.36	+184.25	+28.30	+5.14	+25.64	+51.20	+3.53	−81.96	−11.43	−1.74	−.10	−.08	----
−26.01	−27.84	−40.71	+95.48	−165.50	−52.97	−16.64	+36.94	−11.22	+58.28	−59.16	−19.55	−.12	−.15	----
+53.83	+50.74	−2.40	−168.27	−105.38	−28.55	−25.31	+50.74	−1.54	+83.10	−6.54	−3.93	−.10	−.05	----
+8.75	+7.13	−23.18	−43.62	+188.54	+58.26	−16.95	+37.41	−10.62	+60.44	−57.93	−19.07	−.30	−.07	----
−14.95	−16.82	−1.28	+34.30	+188.40	+56.26	+16.16	+34.97	+14.51	−47.74	−68.84	−19.71	−.10	+.04	----

Observation Equations in x

TITAN$_6$—RHEA$_5$—Continued

Date	$d\pi_6$	dM_6	de_6	$\left(\frac{da}{a}\right)_6$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$\left(\frac{da}{a}\right)_5$	$\frac{C-O}{n}$	v_{11}	v_{12}
1910									″	″	″
Oct. 12	−156.30	−161.58	+291.44	−122.89	−44.52	−44.74	+107.90	+75.58	+0.17	+0.12	----
16	+135.58	+136.43	+311.03	−147.49	+20.57	+13.88	+ 93.84	+85.47	+ .21	+ .10	----
17	+187.97	+187.49	+383.82	− 75.94	−84.53	−34.56	+167.22	+24.11	+ .09	− .02	----
18	+204.84	+202.36	+397.36	− 4.91	−48.14	+32.28	+116.82	−73.60	+ .04	+ .02	----
20	+150.80	+145.88	+278.24	+144.40	+66.68	+33.32	+141.34	+57.50	− .26	− .17	----
20	+149.04	+144.16	+275.74	+146.29	+63.98	+34.00	+137.38	+60.48	+ .08	+ .18	----
Nov. 17	+142.46	+143.64	+318.29	−138.96	−19.10	−29.78	+ 88.49	+85.18	+ .17	+ .08	----
26	−182.94	−183.02	+374.72	+ 85.84	−22.62	−34.36	+ 88.56	+83.54	− .18	− .04	----
Dec. 9	− 5.18	− 6.08	+195.12	+202.90	+40.62	+19.02	+108.82	+74.87	.00	+ .15	----
13	−195.34	−197.50	+386.26	+ 4.63	+80.63	− 1.46	+163.34	+25.92	+ .15	+ .02	----
21	+194.22	+191.98	+378.19	+ 16.95	+31.68	−44.92	+ 89.36	−77.39	+ .09	.00	----
27	−137.94	−136.80	+302.28	+137.87	+51.05	+19.92	+119.48	+65.16	− .08	− .01	----
29	−190.33	−192.39	+376.50	+ 3.27	−72.14	+ 9.16	+149.43	−39.93	− .10	− .14	----
30	−174.71	−178.58	+336.83	− 69.42	+24.39	−38.53	+ 84.16	−78.66	+ .06	− .10	----
1911											
Jan. 10	− 9.72	− 10.40	+186.44	+192.14	+ 4.22	−10.30	+ 80.40	+80.62	− .20	− .01	----
16	−123.77	−127.84	+249.80	−131.67	−73.26	+ 2.23	+119.88	−31.69	+ .25	+ .06	----
1911											
Sept. 11	−191.34	−197.50	+327.16	− 12.37	+ 4.92	+25.03	+ 80.68	+83.90	− .12	− .07	----
11	−191.07	−197.28	+325.38	− 15.12	+ 0.79	+20.96	+ 81.40	+84.04	− .08	− .03	----
12	−169.47	−176.65	+259.95	− 87.01	−81.66	+29.06	+163.36	+20.24	+ .35	+ .17	----
12	−168.62	−175.77	+258.10	− 88.66	−82.30	+22.76	+163.98	+17.55	−4.61	([1])	----
16	+108.74	+107.39	+267.87	−160.40	−56.20	−12.08	+128.48	+63.40	+ .31	+ .21	----
16	+110.25	+108.90	+269.66	−159.42	−58.18	−11.68	+131.15	+61.58	− .24	− .34	----
30	− 44.02	− 48.16	+161.81	−190.03	−82.02	+10.84	+165.95	+27.43	+ .20	− .06	----
30	− 41.36	− 45.41	+162.05	−190.65	−83.22	+14.60	+167.47	+23.58	+ .02	− .24	----
Oct. 4	+201.42	+196.72	+363.27	− 28.62	−54.06	−15.45	+126.85	+68.10	− .03	− .03	----
4	+201.56	+196.81	+362.97	− 27.41	−55.54	−15.44	+128.74	+66.91	.00	− .01	----
11	−159.29	−161.55	+334.98	+127.71	+64.19	−15.27	+140.76	−59.73	− .08	− .13	----
11	−160.73	−163.05	+336.72	+125.76	+66.66	−14.10	+144.28	−56.95	− .02	− .08	----
13	−198.11	−204.62	+336.64	− 28.77	−44.20	−15.28	+115.49	+75.88	+ .27	+ .25	----
13	−197.70	−204.25	+334.98	− 30.96	−47.02	−16.18	+118.67	+74.17	+ .16	+ .13	----
16	− 44.48	− 48.59	+167.17	−193.48	+86.84	+19.70	+173.20	−14.90	+ .39	+ .13	----
16	− 42.31	− 46.35	+167.32	−193.99	+87.34	+22.98	+173.56	−11.64	+ .11	− .15	----
18	+113.03	+111.87	+280.08	−166.88	−75.46	− 8.83	+157.43	+45.63	+ .16	+ .01	----
18	+114.60	+113.44	+281.98	−165.86	−76.88	− 7.00	+159.57	+43.19	+ .36	+ .20	----
26	−110.84	−112.14	+277.92	+176.66	+21.49	+37.28	+ 88.68	+86.06	.00	+ .07	----
26	−112.56	−113.89	+279.98	+175.49	+18.38	+34.19	+ 87.82	+86.78	− .02	+ .05	----
Nov. 1	− 22.69	− 26.06	+175.02	−199.29	−83.75	+55.70	+160.73	−29.77	+ .52	+ .28	----
2	+ 43.02	+ 41.32	+210.69	−196.85	−11.44	+26.16	+ 87.27	−88.19	− .15	− .25	----
2	+ 44.96	+ 43.28	+212.22	−196.45	− 8.52	+23.22	+ 87.10	−88.52	− .03	− .13	----
13	−199.94	−204.20	+379.50	+ 44.95	+39.58	+50.46	+100.36	+79.73	− .21	− .14	----
13	−200.45	−204.76	+379.36	+ 42.47	+36.13	+47.64	+ 97.82	+81.34	− .32	− .25	----
18	+ 55.07	+ 53.73	+221.99	−193.84	−18.52	− 5.45	+ 94.33	+86.92	+ .23	+ .16	----
18	+ 57.07	+ 55.76	+223.76	−193.29	−21.53	− 8.03	+ 96.04	+86.23	+ .08	+ .01	----
22	+196.74	+190.38	+322.60	+ 72.50	+24.96	+35.91	+ 91.94	+85.16	− .20	− .12	----
22	+196.11	+189.71	+320.90	+ 74.28	+22.14	+33.22	+ 90.78	+85.93	− .21	− .12	----
25	+ 31.38	+ 28.03	+176.49	+208.64	+45.42	−25.10	+115.82	−76.08	+ .09	+ .02	----
25	+ 29.14	+ 25.84	+176.84	+208.94	+48.45	−26.28	+119.18	−74.19	+ .07	− .01	----
Dec. 7	+204.88	+200.58	+375.96	− 11.18	−87.54	+12.26	+174.74	+ 5.41	− .08	− .17	----
7	+205.02	+200.63	+375.38	− 9.21	−87.66	+15.28	+174.68	+ 2.38	− .14	− .23	----
8	+194.85	+188.80	+324.90	+ 69.75	−16.30	+24.91	+ 88.63	−86.10	+ .04	+ .08	----
8	+194.22	+188.14	+323.20	+ 71.60	−13.32	+21.98	+ 87.91	−86.61	+ .12	+ .16	----
10	+ 97.52	+ 92.44	+190.89	+184.24	+48.42	+51.10	+109.87	+72.84	+ .09	+ .09	----
10	+ 95.15	+ 90.13	+189.53	+185.47	+44.88	+48.93	+106.30	+75.06	+ .09	+ .10	----
18	− 91.70	− 96.78	+190.57	−172.20	+76.26	−23.15	+156.26	−41.12	+ .33	+ .10	----
18	− 89.72	− 94.74	+189.40	−173.21	+77.76	− 21.00	+158.78	−38.19	− .16	− .40	----
1912											
Jan. 10	+148.56	+142.70	+241.88	+131.74	+83.52	+ 7.08	+166.92	− 3.01	− .15	− .26	----
10	+147.27	+141.40	+240.02	+133.21	+83.58	+ 10.12	+166.85	+ 0.04	− .07	− .18	----
19	− 84.28	− 88.95	+181.48	−164.93	+81.87	+ 1.38	+163.92	− 7.79	+ .50	+ .27	----
19	− 82.41	− 87.02	+180.43	−165.84	+82.12	+ 4.41	+164.22	− 4.75	+ .49	+ .26	----
20	− 5.74	− 8.04	+173.02	−185.03	+15.81	+ 20.19	+ 84.12	+80.53	+ .14	+ .07	----
20	− 3.83	− 6.08	+173.68	−185.09	+13.01	+ 17.48	+ 83.29	+81.03	− .06	− .13	----
24	+190.63	+186.67	+350.12	− 2.44	+67.82	+ 45.02	+135.72	+45.16	+ .08	+ .08	----
24	+190.68	+186.63	+349.29	− 0.21	+65.88	+ 46.04	+132.44	+47.99	+ .62	+ .63	----
27	+ 84.72	+ 80.28	+177.01	+173.58	+ 3.48	+ 0.90	+ 81.25	−80.95	+ .14	+ .13	----
27	+ 83.02	+ 78.60	+176.11	+174.40	+ 6.46	− 2.04	+ 81.77	−80.76	− .09	− .11	----
1913											
Oct. 4	− 23.30	− 28.62	+ 80.50	−191.01	+74.98	+130.28	+ 83.92	+39.07	− .13	− .24	−0.24
4	− 20.80	− 26.06	+ 82.34	−191.36	+73.16	+129.49	+ 80.24	+42.37	+ .13	+ .02	+ .02
14	−104.47	−109.61	+205.95	+169.49	−14.12	+ 51.09	+ 73.33	+84.79	− .24	− .30	− .30
14	−106.81	−112.00	+208.24	+167.94	−18.32	+ 49.32	+ 77.22	+83.99	+ .08	+ .02	+ .01
26	+166.26	+156.69	+ 87.04	+126.04	+82.45	+ 92.36	+139.75	−29.50	+ .18	+ .08	+ .08

[1] Not used.

Observation Equations in y

TITAN$_6$—RHEA$_5$—Continued

$d\pi_6$	dM_6	de_6	$d(\gamma \sin \theta)_6$	$d(\gamma \cos \theta)_6$	$\left(\frac{da}{a}\right)_6$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_5$	$\frac{C-O}{n}$	v_{11}	v_{12}
												″	″	″
−36.13	−38.66	+ 7.56	+106.70	+157.10	+44.89	+21.92	+44.92	− 8.51	−75.40	+36.53	+12.92	−0.09	+0.03	----
−42.04	−44.39	−49.14	+150.25	−118.66	−39.54	+24.64	+48.80	+ 8.99	−79.72	−26.50	− 5.92	+ .07	− .04	----
−21.20	−22.95	−34.80	+ 86.11	−173.59	−54.30	+ 6.93	+27.59	− 4.80	−29.88	+78.52	+24.33	+ .20	+ .07	----
− 0.72	− 2.36	−14.39	+ 19.89	−194.87	−58.82	−21.14	+42.06	+14.53	+66.12	+51.94	+13.83	+ .05	− .05	----
+41.83	+39.23	+ 8.83	−126.00	−154.88	−42.67	+16.47	+34.96	+15.08	−49.14	−68.38	−19.09	+ .15	+ .07	----
+42.36	+39.75	+ 8.68	−127.94	−153.34	−42.16	+17.33	+36.10	+15.28	−52.22	−66.06	−18.32	+ .20	+ .12	----
−37.57	−39.76	−42.44	+148.63	−120.06	−39.55	+23.35	+46.98	+ 0.71	−83.33	+ 9.00	+ 5.26	+ .07	− .04	----
+22.58	+20.92	−31.87	−104.40	+163.72	+49.88	+22.64	+45.68	+ 0.40	−82.30	+12.04	+ 6.16	− .11	.00	----
+54.31	+51.36	−20.36	−193.90	− 22.45	+ 2.15	+20.06	+38.46	+15.76	−66.58	−47.73	−10.85	− .08	− .07	----
+ 0.50	− 0.98	− 9.28	− 31.28	+185.35	+52.19	+ 6.95	+23.37	+10.52	−15.00	−80.09	−21.53	− .07	+ .08	----
+ 5.25	+ 3.76	− 3.34	+ 11.36	−187.25	−51.66	−20.60	+42.06	− 0.74	+77.71	−20.86	− 8.46	+ .21	+ .17	----
+36.18	+34.18	−37.96	−150.97	+111.49	+37.25	+17.37	+33.32	+16.72	−56.06	−56.57	−13.57	− .01	+ .07	----
+ 0.15	− 1.30	− 8.34	− 30.47	+180.63	+50.69	−10.66	+25.08	+13.91	+29.48	+73.66	+19.20	− .13	.00	----
−19.15	−20.90	+ 8.12	+ 40.91	+176.24	+46.27	−20.94	+42.36	+ 1.22	+78.02	−13.90	− 6.52	− .04	+ .16	----
+51.38	+48.58	−19.65	−184.16	− 18.30	+ 3.33	+21.57	+42.24	+ 8.83	−76.50	−13.21	− 1.11	− .03	− .02	----
−35.87	−38.19	+11.42	+107.72	+136.36	+32.78	− 8.54	+23.04	+12.19	+22.26	+73.45	+19.69	− .07	+ .03	----
− 4.87	− 6.76	−32.14	+ 48.55	+170.80	+70.87	+31.20	+60.98	−13.41	−77.29	+ 9.30	− 2.02	− .05	− .01	----
− 5.89	− 7.79	−31.34	+ 50.99	+170.06	+70.77	+31.26	+60.72	−14.92	−76.74	+13.09	− 0.49	− .17	− .13	----
−32.48	−35.12	−18.72	+111.82	+136.49	+62.64	+ 7.72	+30.34	−15.40	− 5.02	+77.76	+30.33	+ .10	+ .11	----
−33.09	−35.74	−18.66	+113.14	+135.42	+62.31	+ 6.71	+30.13	−14.39	− 2.46	+77.92	+30.56	−3.90	(1)	----
−59.14	−61.76	−89.59	+124.30	−129.54	−40.46	+23.67	+44.04	−27.05	−48.54	+61.67	+20.72	− .18	− .31	----
−58.79	−61.39	−89.50	+123.11	−130.71	−41.02	+23.00	+43.05	−26.91	−46.56	+63.20	+21.46	− .03	− .16	----
−69.82	−73.70	−56.08	+180.84	+ 4.93	+15.86	+10.30	+32.08	−17.47	−11.74	+79.34	+30.17	+ .19	+ .12	----
−70.04	−73.91	−57.08	+180.92	+ 2.40	+14.88	+ 8.88	+31.54	−16.09	− 8.03	+79.82	+30.62	− .05	− .12	----
−10.16	−11.92	−45.39	− 10.42	−188.45	−73.78	+25.16	+47.06	−26.57	−53.56	+60.36	+19.72	+ .28	+ .16	----
− 9.71	−11.47	−44.96	− 11.56	−188.41	−73.85	+24.73	+46.37	−26.57	−52.24	+61.50	+20.26	+ .38	+ .26	----
+46.26	+44.22	−81.22	− 88.74	+167.57	+58.24	−22.00	+42.72	−25.57	+44.60	−68.12	−23.34	− .22	− .06	----
+45.54	+43.52	−80.60	− 86.68	+168.54	+58.77	−20.98	+41.43	−25.15	+41.68	−69.95	−24.25	− .10	+ .06	----
−10.80	−12.87	−26.84	+ 60.38	+175.87	+71.99	+27.80	+52.09	−25.18	−62.62	+52.29	+15.97	− .19	− .15	----
−11.59	−13.68	−26.28	+ 62.30	+175.15	+71.85	+27.19	+50.94	−25.52	−60.62	+54.60	+17.00	− .17	− .14	----
−70.28	−74.19	−54.22	+184.29	+ 7.96	+15.81	− 5.62	+31.28	−12.12	+ 0.31	−81.87	−31.60	− .12	− .07	----
−70.47	−74.39	−55.03	+184.42	+ 5.89	+15.02	− 4.44	+31.14	−10.92	− 2.75	−81.83	−31.79	+ .01	+ .05	----
−60.26	−63.02	−88.56	+133.75	−131.16	−41.23	+16.76	+37.18	−22.13	−30.35	+76.14	+27.34	+ .30	+ .16	----
−59.90	−62.64	−88.48	+132.58	−132.40	−41.80	+15.88	+36.40	−21.47	−27.90	+77.07	+27.86	+ .08	− .06	----
+63.33	+60.60	−89.12	−144.68	+129.33	+40.19	+31.02	+62.44	− 3.88	−82.21	− 7.20	− 7.95	− .04	− .05	----
+62.92	+60.23	−89.08	−143.35	+130.74	+40.80	+31.29	+62.75	− 4.99	−82.41	− 4.23	− 6.82	− .03	− .04	----
−71.32	−75.22	−58.96	+186.60	− 8.75	+ 7.75	−10.51	+36.55	+ 3.65	+39.18	+72.91	+30.13	+ .04	− .04	----
−70.28	−73.82	−78.28	+174.70	− 68.60	−15.74	−31.62	+63.02	− 6.65	+82.79	− 1.80	+ 4.30	.00	− .01	----
−70.11	−73.64	−78.71	+174.02	− 70.31	−16.43	−31.74	+63.08	− 7.70	+82.68	− 4.54	+ 3.25	+ .29	+ .28	----
+15.51	+13.74	−47.12	− 15.04	+190.57	+70.81	+28.21	+58.05	+ 4.02	−78.78	−26.22	−14.22	+ .12	+ .15	----
+14.62	+12.85	−46.22	− 12.70	+190.68	+70.97	+28.79	+58.96	+ 3.03	−79.82	−22.82	−13.00	− .01	+ .02	----
−68.14	−71.58	−76.77	+172.40	− 75.26	−19.78	+30.75	+60.04	−14.82	−78.09	+28.03	+ 6.36	+ .27	+ .16	----
−67.94	−71.35	−77.14	+171.63	− 77.06	−20.48	+30.52	+59.44	−15.73	−77.07	+30.72	+ 7.43	+ .12	+ .01	----
+25.83	+23.45	−12.73	− 90.74	−173.50	−68.86	+29.93	+60.53	+ 0.56	−81.88	−12.76	− 8.96	+ .30	+ .21	----
+26.45	+24.06	−12.46	− 92.32	−172.70	−68.63	+30.21	+60.94	− 0.38	−82.26	−10.05	− 7.97	+ .16	+ .07	----
+73.06	+69.26	−51.51	−197.06	− 4.84	−10.55	−26.80	+52.04	−20.41	+65.09	−51.17	−15.80	− .19	− .09	----
+73.16	+69.37	−52.30	−197.11	− 2.72	− 9.76	−26.14	+50.86	−20.82	+62.98	−53.74	−16.86	− .14	− .03	----
− 3.42	− 5.24	−31.95	− 10.46	−191.69	−71.05	+ 2.06	+30.26	− 5.30	+ 4.62	+81.92	+30.44	+ .14	.00	----
− 2.71	− 4.56	−31.30	− 12.30	−191.60	−71.09	+ 1.00	+30.26	− 4.25	+ 7.45	+81.72	+30.49	+ .14	+ .01	----
+24.60	+22.28	−10.94	− 84.48	−174.22	−67.34	−29.90	+60.07	− 0.56	+81.77	+ 5.71	+ 5.84	− .10	− .11	----
+25.23	+22.90	−10.65	− 86.16	−173.46	−67.12	−30.08	+60.33	− 1.58	+81.92	+ 2.89	+ 4.80	− .22	− .23	----
+63.97	+60.38	−24.34	−181.05	− 72.61	−33.33	+25.20	+52.43	+ 8.78	−72.94	−37.11	−16.96	+ .21	+ .17	----
+64.39	+60.77	−25.14	−181.97	− 70.30	−32.51	+25.97	+53.67	+ 8.05	−74.64	−33.59	−15.73	.00	− .05	----
−59.52	−63.14	−23.08	+168.81	+ 69.82	+31.20	−14.36	+35.56	−15.86	+30.31	−75.26	−26.27	− .38	− .27	----
−59.87	−63.49	− 23.74	+169.59	+ 67.89	+30.51	−13.36	+34.68	−15.13	+27.42	−76.37	−26.80	.00	+ .10	----
+45.53	+42.64	− 6.02	−134.62	−128.41	−50.64	− 1.20	+28.66	− 3.10	− 5.74	−78.09	−28.74	+ .06	+ .08	----
+46.04	+43.12	− 6.20	−135.86	−127.09	−50.20	− 0.15	+28.68	− 2.05	− 8.59	−77.84	−28.76	− .01	+ .01	----
−56.87	−60.31	− 21.16	+160.51	+ 65.88	+28.57	− 2.85	+28.41	− 4.58	− 1.42	−77.02	−28.22	+ .11	+ .18	----
−57.19	−60.64	− 21.78	+161.18	+ 64.08	+27.93	− 1.80	+28.30	− 3.54	− 4.27	−76.91	−28.30	+ .14	+ .21	----
−63.62	−67.14	− 48.21	+173.18	− 9.00	+ 1.54	+27.74	+55.73	+ 2.10	−76.63	− 6.14	− 5.61	− .04	− .11	----
−63.64	−67.16	− 48.83	+173.10	− 10.79	+ 0.88	+27.92	+56.02	+ 1.16	−76.81	− 3.48	− 4.65	− .08	− .16	----
− 0.39	− 2.11	− 25.40	− 12.62	−178.07	−65.64	+15.46	+37.36	+10.70	−49.30	−58.18	−23.53	+ .16	+ .08	----
+ 0.38	− 1.34	− 24.69	− 14.72	−177.95	−65.66	+16.44	+38.50	+11.06	−51.80	−56.04	−22.85	− .56	− .64	----
+60.06	+56.69	− 21.95	−168.62	− 65.34	−28.81	−28.02	+55.87	− 4.38	+74.87	−12.22	− 1.04	− .15	− .10	----
+60.34	+56.95	− 22.52	−169.28	− 63.68	−28.22	−27.96	+55.69	− 5.40	+74.37	−11.97	− 2.07	+ .05	+ .10	----
−83.64	−86.45	−140.81	+140.20	−100.30	+10.54	+16.92	+42.59	−21.18	−70.21	−28.40	−33.41	+ .11	+ .05	+ .05
−83.79	−86.57	−141.60	+138.92	−102.14	+ 9.45	+18.40	+44.22	−21.50	−71.41	−25.25	−32.63	+ .34	+ .28	+ .28
+74.37	+73.24	−149.76	− 49.28	+171.48	+45.44	+37.60	+49.63	−56.81	−49.52	+58.98	+ 5.82	+ .34	+ .38	+ .39
+73.72	+72.62	−149.08	− 46.84	+172.07	+46.47	+37.27	+47.92	−57.61	−46.54	+61.38	+ 7.68	+ .09	+ .13	+ .13
+54.86	+52.04	− 81.98	−183.53	− 35.81	−72.95	−13.47	+22.70	−39.12	−27.71	−73.43	−36.33	+ .13	+ .18	+ .18

[1] Not used.

Observation Equations in x

TITAN$_6$—RHEA$_5$—Continued

Date	$d\pi_6$	dM_6	de_6	$\left(\frac{da}{a}\right)_6$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$\left(\frac{da}{a}\right)_5$	$\frac{C-O}{n}$	v_{11}	v_{12}
1913									$''$	$''$	$''$
Oct. 26	+165.39	+155.83	+ 86.01	+127.18	+83.20	+ 94.60	+139.57	−27.38	+0.24	+0.14	+0.14
28	+ 42.52	+ 36.71	+ 74.22	+202.96	−58.91	+ 54.56	+123.03	+65.04	+ .15	+ .16	+ .16
28	+ 39.61	+ 33.87	+ 75.97	+203.49	−62.23	+ 57.52	+126.53	+61.88	+ .08	+ .09	+ .09
29	− 36.37	− 41.06	+139.64	+202.52	−74.47	+131.53	+ 84.03	−46.62	+ .02	+ .05	+ .05
29	− 38.95	− 43.64	+142.25	+201.97	−72.24	+130.17	+ 80.20	−50.01	− .12	− .09	− .09
31	−166.53	−173.73	+258.41	+114.14	+86.36	+129.63	+115.49	+17.63	+ .14	− .02	− .02
31	−167.76	−175.06	+258.76	+112.24	+85.65	+130.96	+112.38	+20.95	− .01	− .17	− .17
Nov. 4	− 88.90	− 96.23	+ 60.52	−179.51	+83.49	+ 91.71	+142.64	−29.64	+ .15	− .05	− .05
4	− 86.74	− 94.01	+ 60.80	−180.62	+84.63	+ 95.31	+142.30	−26.21	+ .26	+ .07	+ .07
6	+ 56.89	+ 52.35	+163.10	−195.83	−51.16	+ 48.13	+115.79	+72.49	+ .10	+ .06	+ .05
6	+ 59.42	+ 54.87	+165.73	−195.16	−54.36	+ 49.79	+119.38	+70.13	+ .16	+ .12	+ .11
17	−201.42	−211.17	+243.22	+ 28.12	+29.94	+ 43.90	+ 93.82	−84.51	+ .18	− .05	− .04
17	−201.65	−211.41	+241.66	+ 25.91	+33.05	+ 43.44	+ 97.10	−83.35	+ .10	− .13	− .13
22	+ 76.58	+ 72.07	+188.80	−192.39	+79.38	+ 75.05	+146.17	−42.35	+ .08	− .05	− .05
22	+ 78.86	+ 74.34	+191.23	−191.54	+81.04	+ 78.62	+147.03	−39.06	+ .24	+ .11	+ .11
24	+189.76	+182.17	+277.67	− 93.31	−46.84	+ 43.09	+113.25	+76.85	+ .15	+ .11	+ .11
24	+190.68	+183.03	+277.52	− 91.45	−49.56	+ 43.91	+116.36	+75.12	+ .09	+ .05	+ .05
Dec. 3	−203.14	−212.79	+251.74	+ 26.33	−43.43	+ 40.44	+110.30	+79.10	+ .13	− .03	− .04
3	−203.38	−213.08	+250.02	+ 23.83	−46.67	+ 41.02	+113.99	+77.24	+ .07	− .09	− .10
4	−194.36	−204.99	+173.64	− 60.82	−83.89	+129.74	+111.45	−33.27	+ .27	+ .13	+ .13
4	−193.73	−204.34	+171.62	− 62.72	−82.75	+130.04	+108.52	−35.99	+ .21	+ .07	+ .07
8	+ 73.88	+ 69.49	+190.37	−194.01	−82.49	+ 76.78	+150.54	+36.60	+ .04	+ .02	+ .02
8	+ 76.02	+ 71.64	+192.63	−193.25	−83.81	+ 80.16	+150.96	+33.46	+ .04	+ .02	+ .02
11	+213.65	+204.03	+246.40	− 6.37	+71.47	+124.94	+ 88.66	+55.12	+ .11	+ .04	+ .03
11	+213.75	+204.08	+245.01	− 4.56	+69.71	+123.74	+ 86.11	+57.33	+ .14	+ .07	+ .06
13	+161.88	+152.49	+102.36	+141.39	−86.34	+125.70	+121.20	−25.98	+ .15	+ .17	+ .17
13	+160.58	+151.23	+101.06	+142.85	−85.41	+126.56	+118.29	−28.88	− .08	− .06	− .06
15	+ 21.20	+ 15.91	+104.26	+211.71	+89.99	+105.17	+146.17	− 5.91	+ .16	+ .10	+ .09
15	+ 19.43	+ 14.16	+105.50	+211.85	+90.10	+107.48	+144.66	− 3.15	+ .18	+ .11	+ .11
19	−203.80	−213.64	+245.79	+ 7.38	+72.74	+ 55.67	+144.50	−53.01	+ .40	+ .14	+ .14
19	−203.80	−213.64	+244.76	+ 6.07	+73.86	+ 57.28	+145.57	−51.43	+ .21	− .05	− .05
27	+212.03	+202.42	+241.80	+ 7.35	−47.14	+ 99.90	+ 68.52	−76.07	− .02	− .05	− .04
27	+212.03	+202.37	+240.22	+ 9.28	−44.57	+ 97.19	+ 67.24	−77.60	+ .04	+ .01	+ .01
30	+ 93.65	+ 86.57	+ 79.83	+190.39	−27.58	+ 36.16	+ 94.60	+84.91	+ .17	+ .16	+ .15
30	+ 91.66	+ 84.63	+ 79.91	+191.31	−30.80	+ 35.21	+ 97.86	+83.79	+ .06	+ .05	+ .04
1914											
Jan. 5	−187.54	−197.72	+176.57	− 70.14	−60.36	+111.13	+ 80.30	−65.05	+ .08	− .07	− .07
5	−186.77	−196.93	+174.55	− 72.02	−58.13	+109.16	+ 78.08	−67.04	+ .38	+ .23	+ .23
8	+ 10.27	+ 5.73	+132.18	−201.34	−29.46	+ 33.66	+ 96.40	+83.38	− .09	− .16	− .17
8	+ 12.80	+ 8.31	+134.37	−201.24	−33.01	+ 32.76	+100.09	+82.04	+ .09	+ .02	+ .02
13	+194.40	+184.56	+176.32	+ 77.45	−66.39	+ 42.57	+138.33	+57.58	− .16	− .19	− .19
13	+193.60	+183.78	+174.22	+ 79.43	−68.52	+ 44.92	+140.67	+55.03	− .36	− .39	− .39
14	+150.04	+141.26	+106.18	+145.81	−64.39	+112.55	+ 86.45	−59.64	− .08	− .07	− .07
22	−136.71	−145.39	+105.08	−139.79	−65.85	+ 40.69	+137.38	+56.49	+ .24	+ .10	+ .09
27	+192.35	+184.97	+282.98	− 63.22	−86.06	+ 96.07	+142.81	− 1.03	+ .06	+ .06	+ .06
29	+183.70	+174.22	+161.31	+ 89.56	+82.41	+ 71.81	+150.28	−23.92	− .03	− .15	− .14
Feb. 2	− 71.81	− 75.77	+190.95	+185.76	+39.79	+ 27.53	+106.10	−75.38	+ .14	+ .04	+ .04
2	− 75.39	− 79.37	+194.80	+184.20	+44.99	+ 27.84	+112.09	−72.39	+ .16	+ .05	+ .06
3	−138.64	−143.75	+259.94	+139.27	+78.96	+111.38	+116.35	+31.73	+ .08	− .04	− .04
3	−141.09	−146.28	+262.05	+136.62	+76.76	+112.28	+110.95	+36.74	+ .06	− .06	− .06
4	−178.81	−185.98	+278.80	+ 75.70	−12.87	+ 36.89	+ 79.68	+83.94	+ .33	+ .20	+ .19
4	−179.56	−186.78	+278.51	+ 73.70	−16.03	+ 34.95	+ 82.23	+83.39	+ .26	+ .13	+ .12
7	−123.42	−131.53	+ 97.24	−144.93	+80.48	+ 67.38	+148.42	−25.72	+ .18	− .04	− .04
17	− 2.53	− 6.85	+121.16	+195.56	+48.08	+ 92.98	+ 71.91	+67.61	+ .12	+ .09	+ .09
17	− 4.66	− 8.95	+122.88	+195.47	+45.35	+ 90.29	+ 69.98	+69.47	− .17	− .20	− .20
24	− 53.50	− 59.14	+ 86.51	−177.43	−24.65	+ 68.08	+ 62.37	−78.07	− .05	− .15	− .15
24	− 51.82	− 57.41	+ 87.07	−177.95	−22.14	+ 65.45	+ 62.35	−78.82	− .09	− .19	− .19
26	+ 91.66	+ 87.90	+207.28	−164.18	+52.50	+ 96.24	+ 75.30	+62.46	− .09	− .15	− .15
26	+ 93.22	+ 89.44	+208.93	−163.34	+50.42	+ 94.35	+ 73.37	+64.14	+ .34	+ .28	+ .28
27	+151.22	+145.99	+262.66	−114.80	−56.06	+ 30.75	+122.89	+59.02	− .06	− .09	− .09
Mar. 4	+ 71.15	+ 65.21	+ 78.88	+177.89	−77.29	+ 65.27	+142.00	+23.05	− .23	− .21	− .21
1914											
Oct. 1	−130.89	−138.19	+164.78	+134.34	+43.90	+110.08	+ 20.03	+69.34	− .22	− .25	− .26
18	−179.43	−189.34	+156.30	+ 67.54	+76.12	+115.95	+105.41	−37.09	.00	− .15	− .15
21	−126.30	−134.98	− 18.67	−145.38	−76.02	+149.46	+ 47.22	−38.17	+ .25	+ .19	+ .18
27	+203.89	+192.79	+ 87.86	+ 19.18	+75.91	+113.94	+108.18	−40.41	− .04	− .07	− .07
30	+ 78.03	+ 71.18	− 8.42	+188.08	−79.89	+153.44	+ 55.36	−32.78	− .08	+ .06	+ .06
31	− 3.70	− 9.26	+ 57.00	+201.86	+26.04	+ 68.56	+ 69.44	−82.53	+ .06	+ .04	+ .04
Nov. 2	−146.55	−154.60	+178.02	+133.36	− 0.58	+ 74.32	+ 44.89	+86.81	+ .32	+ .16	+ .16
3	−183.74	−193.84	+163.97	+ 71.01	−82.69	+129.21	+106.64	+26.70	+ .17	.00	+ .01
4	−196.11	−207.50	+ 98.27	− 9.11	−41.29	+110.17	+ 23.54	−76.63	+ .31	+ .05	+ .05
5	−173.74	−184.48	+ 17.64	− 92.00	+72.04	+104.95	+110.31	−49.19	+ .01	− .19	− .20
7	− 56.14	− 62.72	+ 7.38	−191.50	−43.23	+ 73.76	+ 88.37	+76.00	+ .06	− .05	− .05
9	+ 99.66	+ 93.46	+152.51	−178.49	+12.79	+ 70.00	+ 57.30	−86.77	− .07	− .14	− .14
13	+185.91	+175.21	+ 18.88	+ 97.76	−38.29	+107.34	+ 25.50	−79.42	− .01	− .06	− .06
13	+185.57	+174.88	+ 18.37	+ 98.35	−37.35	+106.30	+ 25.64	−79.87	+ .04	− .01	− .01
16	− 2.64	− 8.31	+ 59.94	+206.60	−37.50	+ 70.76	+ 83.92	+80.16	− .01	− .02	− .02

Observation Equations in y

TITAN$_6$—RHEA$_5$—Continued

$d\pi_6$	dM_6	de_6	$d(\gamma \sin\theta)_6$	$d(\gamma \cos\theta)_6$	$\left(\frac{da}{a}\right)_6$	$d\epsilon_5$	$(e \sin\pi)_5$	$(e \cos\pi)_5$	$d(\gamma \sin\theta)_5$	$d(\gamma \cos\theta)_5$	$\left(\frac{da}{a}\right)_5$	$\frac{C-O}{n}$	v_{11}	v_{12}
												″	″	″
+55.35	+52.52	- 82.41	-183.74	- 34.56	-72.57	-12.54	+22.78	-38.13	-29.58	-72.69	-36.67	+0.11	+0.16	+0.16
+88.72	+85.76	-141.24	-161.18	+ 92.49	-18.95	+29.07	+30.69	-55.70	-10.30	+77.96	+25.73	+ .04	+ .04	+ .03
+88.95	+86.01	-142.28	-159.81	+ 94.75	-17.67	+27.69	+29.12	-54.40	- 6.21	+78.39	+27.21	+ .03	+ .03	+ .03
+88.65	+86.52	-159.20	-114.02	+144.94	+15.56	-20.24	+47.77	-21.42	+75.02	+23.91	+33.18	- .07	+ .01	+ .01
+88.41	+86.32	-159.38	-112.11	+146.32	+16.70	-21.75	+49.46	-21.99	+76.05	+20.43	+32.21	- .06	+ .03	+ .03
+50.19	+49.51	-122.34	+ 22.28	+179.56	+72.64	+ 7.36	+34.36	-22.40	-62.04	-48.90	-38.29	+ .22	+ .33	+ .33
+49.36	+48.70	-121.36	+ 24.29	+179.23	+73.18	+ 8.83	+35.75	-21.82	-63.89	-46.48	-37.98	- .12	- .01	- .02
-78.35	-81.71	-118.26	+173.50	- 46.12	+39.17	-13.53	+23.50	-39.14	-27.83	-74.35	-36.77	+ .24	+ .23	+ .23
-78.84	-82.22	-119.32	+172.94	- 48.22	+38.23	-12.01	+23.64	-37.55	-30.84	-73.16	-37.29	+ .16	+ .14	+ .14
-85.72	-87.86	-159.31	+ 98.74	-153.80	-24.55	+32.31	+35.96	-58.13	-20.31	+76.88	+22.25	- .11	- .24	- .25
-85.43	-87.52	-159.31	+ 96.78	-155.10	-25.66	+31.28	+34.36	-57.40	-16.85	+77.69	+23.67	+ .13	.00	.00
+12.60	+11.49	- 84.94	+ 97.36	+154.13	+87.97	-37.50	+48.18	-58.88	+41.45	-68.85	-12.80	- .06	+ .07	+ .07
+11.63	+10.51	- 84.22	+ 99.02	+153.02	+88.09	-37.00	+46.73	-59.10	+38.89	-70.34	-14.18	+ .02	+ .15	+ .15
-84.16	-86.16	-159.08	+ 88.59	-163.12	-33.17	-19.11	+25.96	-44.74	-15.48	-79.14	-34.85	- .02	- .03	- .04
-83.79	-85.75	-158.89	+ 86.72	-164.21	-34.17	-17.66	+25.56	-43.16	-18.71	-78.45	-35.60	- .48	- .50	- .50
-41.04	-41.92	-111.72	- 44.02	-184.37	-82.75	+34.18	+40.98	-58.36	-27.06	+76.00	+20.30	+ .04	- .06	- .06
-40.24	-41.11	-110.82	- 45.84	-183.95	-83.17	+33.44	+39.60	-58.02	-24.32	+76.91	+21.51	- .01	- .11	- .11
+11.78	+10.57	- 83.74	+ 95.66	+156.75	+88.66	+35.14	+43.92	-57.99	-31.30	+74.59	+18.77	- .11	- .11	- .11
+10.69	+ 9.45	- 82.91	+ 97.53	+155.52	+88.78	+34.34	+42.30	-57.75	-28.19	+75.82	+20.21	- .25	- .25	- .25
-26.29	-28.52	- 68.28	+151.46	+101.93	+84.94	-14.27	+43.13	-18.37	+70.08	+40.40	+37.20	+ .08	+ .08	+ .08
-27.12	-29.37	- 68.28	+152.41	+100.42	+84.67	-15.47	+44.44	-18.22	+71.36	+38.10	+36.71	+ .08	+ .08	+ .08
-84.78	-86.96	-157.87	+ 95.43	-159.81	-32.00	+16.57	+26.76	-41.16	+19.86	+78.43	+36.22	+ .11	- .02	- .02
-84.45	-86.60	-157.75	+ 93.74	-160.92	-32.93	+15.19	+26.55	-39.66	+22.81	+77.62	+36.82	.00	- .13	- .13
- 3.06	- 4.48	- 76.87	-113.50	-154.42	-93.25	+23.96	+54.29	-19.02	-78.38	-20.15	-31.82	+ .01	- .02	- .02
- 2.26	- 3.70	- 76.39	-114.82	-153.50	-93.29	+24.95	+55.42	-19.53	-78.98	-17.69	-31.05	+ .02	- .01	- .01
+61.50	+58.30	- 81.47	-189.15	- 36.87	-70.82	-11.03	+40.12	-18.38	+65.86	+46.87	+38.22	+ .16	+ .14	+ .14
+62.14	+58.94	- 82.10	-189.48	- 35.16	-70.26	-12.31	+41.40	-17.98	+67.41	+44.62	+37.83	- .08	- .09	- .09
+92.38	+89.25	-144.61	-161.92	+100.88	- 9.52	- 3.06	+29.54	-27.19	-45.13	-67.08	-39.67	- .30	- .21	- .21
+92.43	+89.31	-145.14	-161.03	+102.21	- 8.74	- 1.84	+30.16	-26.14	-47.15	-65.66	-39.74	- .11	- .02	- .02
+ 3.46	+ 2.03	- 76.39	+105.39	+149.42	+88.91	-23.75	+30.95	-48.08	- 1.90	-80.69	-31.82	- .34	- .23	- .23
+ 2.89	+ 1.44	- 76.02	+106.32	+148.70	+88.92	-23.05	+30.47	-47.37	- 3.63	-80.63	-32.32	- .15	- .04	- .04
+ 2.97	+ 1.37	- 71.42	-118.58	-148.76	-92.51	-33.31	+64.77	-26.28	+79.91	- 7.26	+21.17	+ .06	+ .07	+ .07
+ 3.81	+ 2.19	- 70.98	-119.95	-147.71	-92.49	-34.00	+65.36	-27.46	+79.63	- 9.93	+20.04	+ .11	+ .12	+ .12
+82.92	+79.37	-110.90	-187.26	+ 33.53	-41.05	+37.58	+53.74	-53.85	-46.13	+65.43	+11.74	+ .15	+ .13	+ .13
+83.33	+79.76	-111.83	-186.85	+ 35.44	-40.19	+37.10	+52.29	-54.26	-43.58	+67.13	+13.16	+ .10	+ .08	+ .08
-30.40	-32.82	- 63.37	+149.54	+ 99.38	+81.85	-28.38	+59.79	-19.26	+79.11	+ 8.74	+26.93	- .04	- .01	- .01
-31.21	-33.66	- 63.43	+150.49	+ 97.86	+81.53	-29.26	+60.78	-20.12	+79.34	+ 6.08	+25.96	- .22	- .19	- .19
-87.80	-90.88	-144.13	+141.32	-112.77	- 4.27	+36.91	+53.10	-52.79	-44.48	+65.66	+12.57	+ .17	+ .05	+ .04
-87.76	-90.82	-144.68	+139.93	-114.58	- 5.38	+36.33	+51.47	-53.19	-41.62	+67.50	+14.14	+ .18	+ .05	+ .05
+33.59	+31.15	- 61.58	-157.51	-101.98	-84.86	+25.72	+34.49	-47.92	- 6.44	+78.52	+28.98	+ .13	+ .06	+ .06
+34.46	+32.00	- 61.68	-158.53	-100.37	-84.52	+24.60	+33.44	-46.90	- 3.46	+78.72	+29.93	.00	- .07	- .07
+63.46	+60.16	- 77.94	-184.42	- 34.25	-65.57	-25.97	+56.97	-16.58	+77.25	+14.97	+28.68	- .04	- .02	- .02
-60.86	-64.22	- 77.67	+172.90	+ 28.86	+59.78	+25.24	+34.46	-46.76	- 6.21	+77.54	+28.75	+ .28	+ .19	+ .19
-27.76	-28.89	- 91.74	- 51.56	-174.06	-83.89	- 0.03	+31.42	-21.34	+46.10	+61.87	+37.96	+ .02	- .06	- .07
+38.92	+36.33	- 60.17	-159.66	- 89.89	-80.25	-10.96	+28.10	-31.70	-26.07	-72.38	-36.25	- .08	- .05	- .05
+81.19	+79.06	-145.56	-100.69	+147.40	+31.19	-33.47	+47.40	-50.29	+33.67	-68.58	-17.19	- .23	- .08	- .08
+80.50	+78.44	-145.36	- 97.72	+149.25	+32.76	-32.18	+44.76	-50.18	+28.77	-70.78	-19.50	- .21	- .06	- .06
+60.94	+59.69	-128.36	- 32.48	+173.14	+60.42	+13.61	+42.36	-13.14	-64.63	-40.52	-35.01	- .25	- .15	- .15
+59.78	+58.56	-127.08	- 29.27	+173.58	+61.50	+15.84	+44.74	-12.73	-67.10	-36.26	-34.06	- .24	- .14	- .14
+33.22	+32.19	- 96.82	+ 34.82	+170.53	+78.03	+37.13	+58.79	-45.67	-54.05	+53.59	+ 5.27	- .15	- .12	- .12
+32.35	+31.32	- 95.88	+ 36.68	+170.06	+78.37	+36.90	+57.66	-46.53	-51.99	+55.60	+ 6.66	- .18	- .15	- .15
-63.23	-66.62	- 79.70	+169.67	+ 17.76	+54.06	-11.76	+27.94	-32.05	-23.85	-71.86	-35.42	- .02	- .01	- .02
+85.59	+82.68	-134.08	-143.22	+100.97	+ 0.94	+29.67	+60.26	-18.88	-74.32	+ 1.24	-21.61	- .18	- .14	- .14
+85.55	+82.68	-134.61	-142.07	+102.49	+ 1.87	+30.50	+61.12	-20.05	-74.22	+ 4.20	-20.41	- .22	- .18	- .18
-17.70	-81.12	-110.20	+158.02	- 50.69	+23.60	-34.45	+63.53	-29.02	+69.26	-24.10	+11.31	- .14	- .15	- .15
-77.93	-81.34	-110.94	+157.58	- 52.19	+22.86	-34.80	+63.54	-30.18	+68.45	-26.29	+10.20	+ .19	+ .18	+ .18
-72.04	-73.93	-136.56	+ 74.35	-151.08	-40.04	+27.42	+57.38	-16.42	-72.97	- 4.13	-23.58	+ .12	+ .05	+ .05
-71.68	-73.54	-136.28	+ 72.95	-151.81	-40.72	+28.17	+58.23	-17.24	-73.05	- 1.73	-22.66	+ .20	+ .13	+ .13
-50.49	-51.64	-114.11	+ 7.60	-169.86	-66.20	+26.44	+36.39	-45.55	-12.16	+71.88	+24.55	+ .12	+ .02	+ .01
+78.02	+74.72	-104.28	-167.15	+ 38.65	-31.40	+10.61	+26.90	-29.92	+25.39	+67.59	+34.18	+ .01	- .01	- .01
+58.68	+58.97	-131.16	+ 36.16	+164.59	+56.31	+30.29	+44.27	-45.80	-67.76	+29.07	-19.68	- .04	+ .07	+ .07
+29.85	+29.96	- 99.72	+105.22	+136.46	+77.51	-16.70	+ 8.89	-46.30	-38.29	-65.77	-33.28	- .27	- .17	- .17
-62.56	-64.76	-117.55	+165.27	- 51.29	+55.20	-16.40	+34.75	-31.60	+75.86	+ 9.46	+33.63	- .27	- .18	- .18
+ 7.64	+ 6.79	- 82.08	-164.59	- 82.22	-88.42	-18.17	+ 9.24	-48.33	-36.58	-68.06	-33.19	- .03	- .07	- .07
+81.28	+79.31	-147.97	-149.00	+106.12	-34.45	-14.02	+32.81	-30.94	+76.05	+15.36	+35.33	- .39	- .23	- .23
+87.52	+86.35	-168.84	- 93.42	+155.49	+ 0.94	-36.45	+27.28	-68.51	+21.72	-74.66	-11.04	- .10	+ .09	+ .09
+58.32	+58.64	-133.73	+ 47.78	+171.46	+63.12	+38.23	+38.49	-66.06	-42.89	+65.13	- 0.19	- .04	+ .07	+ .07
+31.40	+31.51	-103.23	+105.75	+141.84	+79.44	+12.18	+11.18	-42.23	+48.43	+61.22	+36.28	+ .02	+ .16	+ .16
- 3.31	- 4.07	- 83.85	+153.43	+ 86.96	+85.09	-33.54	+48.09	-50.30	+69.10	-36.60	+18.58	- .25	- .01	- .01
-39.36	-41.17	- 93.06	+176.08	+ 13.41	+75.68	-22.04	+10.16	-53.21	-29.20	-72.71	-31.48	- .10	- .10	- .10
-82.92	-84.97	-155.19	+134.65	-118.36	+24.98	+33.70	+20.37	-66.92	- 5.75	+78.32	+18.65	+ .36	+ .26	+ .25
-77.82	-78.06	-160.86	+ 10.48	-183.27	-42.68	-38.32	+34.55	-68.59	+33.88	-71.11	- 5.19	- .17	- .09	- .09
+41.87	+40.05	- 93.95	-187.89	- 16.25	-81.09	-34.83	+49.30	-52.18	+68.36	-39.92	+17.30	- .21	- .06	- .06
+42.13	+40.30	- 94.13	-187.93	- 15.65	-80.96	-35.03	+49.24	-52.64	+67.87	-40.72	+16.88	+ .13	+ .28	+ .28
+89.82	+88.55	-172.46	- 98.68	+157.11	+ 0.48	+35.58	+24.41	-68.76	-12.43	+78.47	+16.14	- .14	- .08	- .08

Observation Equations in x

TITAN$_6$—RHEA$_5$—Continued

Date	$d\pi_6$	dM_6	de_6	$\left(\frac{da}{a}\right)_6$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$\left(\frac{da}{a}\right)_5$	$\frac{C-O}{n}$	v_{11}	v_{12}
1914									"	"	"
Nov. 20	−199.99	−211.58	+101.71	− 14.28	+22.93	+ 92.04	+ 31.81	+85.92	+0.10	−0.14	−0.16
22	−123.23	−131.99	− 12.76	−159.80	−49.87	+120.95	+ 27.82	−73.83	+ .04	− .09	− .09
Dec. 12	+177.38	+168.68	+205.52	−117.77	+76.76	+151.06	+ 54.99	+47.73	+ .06	+ .15	+ .15
14	+213.06	+201.51	+104.17	+ 31.16	−89.78	+153.23	+ 94.19	−10.28	− .10	− .10	− .10
14	+212.96	+201.42	+103.42	+ 31.91	−89.64	+153.64	+ 93.09	−11.45	+ .01	+ .01	+ .02
16	+127.44	+118.84	− 5.70	+172.50	+90 07	+142.52	+110.52	− 8.55	+ .19	+ .32	+ .32
16	+126.30	+117.74	− 5.72	+173 30	+90.26	+144.04	+108.99	− 6.40	+ .13	+ .26	+ .26
22	−201.51	−213.21	+105.74	− 31.26	−24.86	+ 64.94	+ 76.29	+86.98	+ .24	− .10	− .10
22	−201.47	−213.16	+105.20	− 31.80	−25.64	+ 64.90	+ 77.09	+86.75	+ .90	+ .56	+ .56
23	−170.53	−181.27	+ 28.44	−111.92	−89.71	+151.94	+ 96.08	−11.38	+ .04	− .11	− .11
23	−169.90	−180.58	+ 27.64	−112.91	−89.48	+152.54	+ 94.46	−13.11	+ .48	+ .34	+ .34
1915											
Jan. 2	+ 49.78	+ 43.39	+ 31.00	+206.35	− 7.54	+ 76.97	+ 48.78	−89.87	− .20	− .21	− .21
2	+ 48.57	+ 42 20	+ 31.86	+206.60	− 5.64	+ 75.61	+ 50.11	−90.01	− .20	− .21	− .22
5	−168.38	−177.01	+212 02	+117.51	−75.11	+ 96.07	+125.68	+49.61	+ .46	+ .29	+ .28
5	−169.20	−177.88	+212.02	+116.29	−76.30	+ 98.20	+126.18	+47.77	− .05	− .23	− .23
8	−159.81	−170.07	+ 26.80	−124.64	+77.66	+148.02	+ 65.28	+45.22	− .56	− .64	− .64
8	−159.22	−169.46	+ 26.27	−125.39	+76.95	+147.46	+ 64.00	+46.42	+ .21	+ .13	+ .13
9	−100.09	−108.07	+ 10.26	−177.22	−24.43	+ 61.67	+ 77.76	+86.39	+ .10	− .09	− .09
9	− 99.28	−107.22	+ 10.40	−177.70	−25.80	+ 61.54	+ 79.18	+85.99	+ .12	− .07	− .07
14	+208.83	+198.36	+184.08	− 37.44	−59.50	+ 73.50	+114.92	+66.72	− .08	− .22	− .21
14	+208.98	+198.50	+183.40	− 36.56	−60.53	+ 74.50	+115.89	+65.78	.00	− .13	− .13
20	−114.08	−120.45	+187.86	+169.93	−13.47	+ 79.00	+ 46.88	−87.82	− .23	− .34	− .34
20	−114.89	−121.27	+188.54	+169.35	−11.96	+ 77.76	+ 47.74	−88.04	+ .51	+ .40	+ .39
28	+131.95	+125.50	+202.87	−157.53	−87.50	+129.01	+118.57	+ 8.79	+ .17	+ .21	+ .21
28	+133.01	+126.53	+203.62	−156.70	−87.68	+130.58	+117.23	+ 6.74	− .45	− .41	− .41
Feb. 9	−148.70	−158.31	+ 32.79	−126.06	+49.69	+113.78	+ 43.97	+70.71	+ .06	− .07	− .07
9	−147.98	−157.57	+ 32.24	−126.90	+48.37	+112.26	+ 43.42	+71.64	+ .14	.00	+ .01
10	− 88.22	− 95.61	+ 20.34	−174.60	−57.31	+ 66.41	+113.48	+64.46	+ .10	− .07	− .07
10	− 86.90	− 94.23	+ 20.69	−175.29	−58.98	+ 67.98	+115.11	+62.94	+ .18	+ .01	+ .01
17	+159.96	+150.45	+ 35.60	+125.07	+72.54	+ 85.89	+125.26	−44.85	+ .16	+ .13	+ .13
17	+159.15	+149.67	+ 34.88	+126.02	+73.53	+ 87.75	+125.69	−43.21	+ .11	+ .08	+ .08
19	+ 27.96	+ 22.33	+ 53.04	+197.79	−54.92	+ 63.22	+110.76	+64.80	− .43	− .45	− .45
19	+ 26.71	+ 21.10	+ 54.02	+197.92	−56.37	+ 64.47	+112.21	+63.53	− .01	− .03	− .03
Mar. 1	+129.45	+123.27	+198.54	−145.81	−78.61	+135.56	+ 84.43	−27.91	− .04	+ .02	+ .02
1	+130.53	+124.31	+199.28	−144.91	−77.87	+135.59	+ 82.30	−29.91	− .30	− .24	− .24
9	−109.57	−115.45	+181.42	+154.45	−35.62	+ 51.89	+ 88.73	+74.09	+ .37	+ .24	+ .24
9	−110.92	−116.83	+182.51	+153.42	−37.90	+ 52.40	+ 91.23	+72.95	+ .02	− .12	− .11
18	+172.86	+164.72	+200.08	− 80.88	−35.52	+ 51.20	+ 87.74	+72.61	+ .55	+ .43	+ .43
18	+173.14	+164.99	+199.86	− 80.31	−36.41	+ 51.40	+ 88.70	+72.17	+ .36	+ .23	+ .24
29	−135.77	−144.58	+ 25.89	−116.30	− 0.29	+ 59.88	+ 51.92	−79.25	+ .71	+ .47	+ .46
29	−134.96	−143.72	+ 25.20	−117.31	+ 1.67	+ 58.62	+ 53.41	−79.23	+ .37	+ .11	+ .12
Apr. 6	+146.99	+138.22	+ 25.06	+114.14	−77.96	+121.46	+ 97.91	− 5.24	+ .11	+ .14	+ .14
6	+146.42	+137.69	+ 24.51	+114.86	−77.85	+122.24	+ 96.69	− 6.68	− .04	− .01	− .01
7	+ 92.34	+ 85.50	+ 8.40	+160.12	− 4.81	+ 62.48	+ 47.49	−77.88	− .10	− .14	− .14
7	+ 91.64	+ 84.84	+ 8.52	+160.51	− 3.54	+ 61.55	+ 48.36	−77.95	+ .09	+ .05	+ .05
1915											
Oct. 25	− 9.59	− 15.21	− 8.75	−192.77	+12.78	+ 85.88	+ 8.98	+82.48	+ .11	+ .05	+ .09
27	+132.37	+124.38	+ 99.57	−146.84	−38.72	+107.00	− 7.94	−74.27	+ .09	+ .09	+ .07
28	+179.80	+169.73	+ 79.26	− 86.18	+68.78	+126.03	+ 73.18	−48.11	− .09	− .10	− .12
29	+199.94	+188.77	+ 14.23	− 12.59	+57.25	+129.67	− 9.84	+61.60	− .29	− .22	− .20
Nov. 9	− 77.44	− 84.18	− 69.68	−180.38	−80.15	+162.52	+ 13.98	−30.25	+ .01	− .06	− .05
10	− 8.35	− 14.13	− 6.94	−198.36	+ 4.62	+ 81.98	+ 26.67	−85.71	− .04	− .16	− .18
17	+106.76	+ 99.44	− 88.22	+173.94	−24.98	+ 84.28	+ 47.96	+83.11	− .40	− .23	− .22
22	−196.65	−208.46	+ 18.74	+ 12.81	−77.86	+141.32	+ 76.54	+39.76	+ .32	+ .24	+ .26
24	−143.60	−152.71	− 94.44	−137.87	+58.53	+110.02	+ 76.59	−65.34	+ .32	+ .11	+ .10
27	+ 74.46	+ 67.93	+ 73.95	−191.99	−87.54	+170.74	+ 39.74	− 9.22	− .10	− .08	− .07
30	+210.35	+198.59	+ 19.91	− 10.59	+32.51	+104.81	− 0.74	+82.21	.00	+ .10	+ .12
Dec. 2	+162.90	+153.44	− 94.55	+132.29	−63.33	+140.92	− 4.36	−61.92	+ .04	+ .20	+ .16
6	−135.17	−143.84	+109.43	+150.76	−86.76	+171.66	+ 32.11	−19.70	− .08	− .08	− .09
15	+194.60	+183.80	+ 95.15	− 86.89	−89.56	+169.26	+ 58.78	+ 4.20	+ .01	+ .13	+ .13
1916											
Jan. 7	−141.10	−149.87	+125.72	+149.60	−75.91	+158.76	+ 15.24	−48.92	+ .10	+ .07	+ .05
8	−187.25	−198.29	+104.07	+ 81.40	+32.09	+ 84.76	+ 63.78	−84.45	.00	− .18	− .21
13	+ 12.98	+ 6.99	+ 30.81	−208.38	+74.69	+126.78	+ 93.87	−50.64	+ .06	− .08	− .08
18	+199.00	+187.73	− 36.90	+ 79.22	+90.00	+168.18	+ 64.20	+ 2.42	− .13	− .05	− .06
Feb. 5	+ 80.91	+ 73.96	− 46.51	+191.67	+88.38	+159.66	+ 76.16	− 6.17	+ .21	+ .27	+ .26
11	−176.15	−187.02	− 36.23	− 91.27	−38.53	+ 81.59	+ 74.28	+78.99	+ .06	− .05	− .02
Mar. 8	+ 65.38	+ 59.01	− 31.39	+186.72	+74.87	+150.94	+ 33.93	+38.81	+ .05	+ .12	+ .13
16	− 39.62	− 45.57	− 10.91	−186.43	+50.21	+ 84.81	+ 85.30	−66.21	+ .25	+ .09	+ .09
17	+ 38.93	+ 33.40	+ 65.16	−188.41	+71.84	+146.36	+ 30.72	+41.46	+ .01	− .08	− .04
25	− 14.77	− 20.18	+ 40.14	+188.97	+45.32	+ 79.79	+ 80.46	−67.99	+ .03	+ .02	− .01
Apr. 10	− 19.84	− 25.12	+ 42.28	+182.75	−62.75	+ 99.83	+ 90.18	+48.49	− .42	− .32	− .31

Observation Equations in y

TITAN$_6$—RHEA$_5$—Continued

$d\pi_6$	dM_6	de_6	$d(\gamma \sin \theta)_6$	$d(\gamma \cos \theta)_6$	$\left(\frac{da}{a}\right)_6$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_5$	$\frac{C-O}{n}$	v_{11}	v_{12}
												″	″	″
− 5.58	− 6.46	− 85.10	+157.33	+ 87.38	+87.09	+37.84	+48.29	−59.22	−60.37	+52.18	−10.57	+0.08	+0.11	+0.11
−69.20	−71.63	−126.84	+171.14	− 59.21	+54.17	−32.38	+50.41	−46.44	+74.32	−29.49	+22.43	− .28	− .15	− .15
−52.13	−52.07	−128.32	− 69.76	−177.54	−77.38	+20.84	+43.26	−32.36	−80.83	− 4.98	−34.38	+ .14	+ .07	+ .07
+13.03	+11.86	− 84.94	−172.11	− 87.06	−93.52	− 4.11	+26.21	−31.33	+70.79	+39.23	+40.01	− .18	− .13	− .13
+13.36	+12.17	− 84.92	−172.42	− 86.46	−93.47	− 4.63	+26.70	−31.14	+71.31	+38.32	+39.96	+ .20	+ .25	+ .25
+75.32	+72.79	−130.36	−182.52	+ 59.99	−56.42	− 4.27	+19.54	−36.02	−61.09	−53.27	−40.07	− .24	− .28	− .27
+75.67	+73.15	−130.98	−182.10	+ 61.16	−55.93	− 3.32	+20.22	−35.34	−62.34	−51.80	−40.16	− .43	− .46	− .46
−13.16	−14.41	− 84.94	+162.52	+ 83.12	+88.70	+38.93	+36.44	−69.64	−27.82	+76.08	+10.65	+ .03	+ .05	+ .05
−13.40	−14.65	− 84.94	+162.74	+ 82.68	+88.66	+38.85	+36.08	−69.67	−27.14	+76.32	+10.99	− .36	− .34	− .34
−48.73	−51.03	− 99.04	+182.39	+ 8.68	+75.32	− 4.62	+27.34	−30.75	+70.87	+39.09	+40.10	+ .01	+ .08	+ .08
−49.17	−51.47	− 99.44	+182.43	+ 7.62	+75.04	− 5.39	+28.08	−30.46	+71.62	+37.71	+40.00	− .34	− .27	− .27
+90.90	+88.66	−162.31	−146.52	+120.81	−22.54	−40.20	+50.82	−62.41	+53.48	−60.39	+ 3.84	− .36	− .14	− .14
+91.01	+88.78	−162.68	−145.78	+121.62	−22.01	−40.27	+50.24	−63.03	+52.19	−61.51	+ 2.99	− .17	+ .05	+ .05
+52.36	+52.36	−129.74	+ 56.43	+174.78	+74.04	+22.62	+16.74	−53.69	+27.05	+75.82	+33.40	− .08	+ .05	+ .06
+51.82	+51.88	−129.09	+ 57.66	+174.34	+74.40	+21.80	+16.52	−52.74	+28.89	+75.15	+33.94	.00	+ .14	+ .14
−54.66	−57.16	−102.49	+181.22	− 1.55	+70.98	+19.88	+44.04	−29.52	−79.79	− 9.63	−35.08	+ .34	+ .28	+ .28
−54.99	−57.51	−102.83	+181.22	− 2.39	+70.72	+20.43	+44.62	−29.76	−79.91	− 8.38	−34.76	+ .04	− .02	− .02
−78.07	−80.84	−136.10	+167.46	− 71.09	+44.74	+38.88	+38.99	−68.10	−29.22	+74.74	+10.51	+ .03	− .07	− .07
−78.29	−81.04	−136.53	+167.19	− 71.88	+44.38	+38.71	+38.36	−68.17	−28.03	+75.19	+11.13	− .14	− .24	− .24
−17.14	−17.67	− 94.60	−126.64	−141.16	−92.36	+30.28	+22.82	−62.00	+ 6.04	+79.68	+26.39	− .16	− .22	− .22
−16.74	−17.29	− 94.34	−127.23	−140.60	−92.44	+29.86	+22.38	−61.56	+ 7.28	+79.56	+26.86	+ .08	+ .02	+ .02
+75.67	+75.27	−159.13	− 14.41	+182.22	+50.14	−39.46	+54.01	−57.90	+57.46	−54.75	+ 6.51	− .34	− .02	− .02
+75.42	+75.02	−158.82	− 13.52	+182.31	+50.51	−39.57	+53.64	−58.47	+56.53	−55.73	+ 5.84	− .25	+ .07	+ .07
−70.34	−70.78	−151.10	− 3.32	−183.44	−58.22	+ 4.42	+21.90	−33.94	+56.79	+54.23	+39.41	.00	.00	.00
−69.97	−70.39	−150.61	− 4.52	−183.48	−58.69	+ 3.49	+22.48	−33.22	+58.03	+52.89	+39.50	− .07	− .06	− .06
−55.78	−58.36	− 99.33	+173.94	− 2.48	+66.54	+31.70	+55.80	−37.78	−73.86	+22.23	−22.83	+ .10	+ .05	+ .05
−56.16	−58.75	− 99.74	+173.90	− 3.46	+66.23	+32.13	+56.06	−38.48	−73.41	+23.61	−22.22	+ .25	+ .20	+ .20
−77.56	−80.34	−132.64	+159.85	− 70.10	+39.75	+29.43	+24.56	−59.30	+ 4.68	+76.83	+25.58	− .04	− .13	− .13
−77.89	−80.67	−133.34	+159.33	− 71.36	+39.15	+28.76	+23.82	−58.60	+ 6.68	+76.68	+26.34	− .03	− .12	− .12
+55.40	+52.95	− 95.70	−181.05	− 5.27	−71.64	−20.66	+18.87	−49.16	−26.21	−71.44	−32.60	+ .45	+ .43	+ .43
+55.81	+53.35	− 96.13	−181.05	− 4.19	−71.31	−19.94	+18.66	−48.32	−27.80	−70.82	−33.06	+ .10	+ .08	+ .08
+88.18	+86.00	−156.66	−131.92	+119.73	−12.96	+29.62	+25.36	−58.88	+ 2.88	+75.70	+24.53	− .39	− .36	− .36
+88.24	+86.08	−157.01	−131.13	+120.53	−12.41	+29.05	+24.70	−58.32	+ 4.60	+75.61	+25.20	− .21	− .18	− .17
−65.44	−65.88	−141.78	− 5.54	−173.78	−57.46	−12.25	+36.06	−24.10	+70.62	+23.36	+35.78	− .01	+ .06	+ .06
−65.06	−65.48	−141.27	− 6.78	−173.78	−57.94	−13.16	+37.02	−24.07	+71.20	+21.55	+35.45	+ .13	+ .21	+ .20
+69.31	+68.88	−146.44	− 12.69	+168.34	+48.59	+33.79	+33.59	−60.74	−15.02	+71.73	+15.77	+ .21	+ .32	+ .32
+68.87	+68.45	−145.86	− 11.17	+168.38	+49.19	+33.29	+32.46	−60.51	−12.77	+72.16	+16.82	+ .20	+ .31	+ .31
−36.60	−36.84	−104.57	− 73.38	−153.50	−77.08	+33.13	+32.72	−59.72	−13.60	+70.76	+15.75	+ .20	+ .14	+ .14
−36.35	−36.60	−104.30	− 73.89	−153.25	−77.21	+32.94	+32.28	−59.64	−12.73	+70.92	+16.15	+ .14	+ .08	+ .09
−51.65	−54.02	− 92.78	+159.29	− 4.92	+61.01	−35.96	+47.12	−54.36	+41.79	−56.97	+ 0.54	+ .26	+ .38	+ .38
−52.11	−54.47	− 93.28	+159.29	− 6.11	+60.63	−35.96	+46.44	−54.94	+40.36	−57.98	− 0.35	− .34	− .22	− .23
+50.63	+48.43	− 89.73	−165.96	− 1.26	−65.99	− 1.98	+24.44	−25.91	+59.46	+36.34	+35.40	+ .02	+ .06	+ .06
+50.96	−48.76	− 90.06	−165.92	− 0.43	−65.74	− 2.63	+24.99	−25.56	+60.12	+35.22	+35.35	.00	+ .05	+ .05
+71.30	+68.94	−119.90	−152.97	+ 61.32	−41.69	−35.30	+47.44	−52.35	+43.49	−54.30	+ 2.58	− .03	+ .13	+ .13
+71.48	+69.13	−120.26	−152.72	+ 62.00	−41.37	−35.34	+47.06	−52.78	+42.60	−54.99	+ 2.01	− .16	.00	.00
−77.41	−77.60	−155.08	+ 57.92	−166.57	+ 4.75	+33.72	+21.42	−64.20	−35.05	+67.74	− 5.58	+ .26	+ .17	+ .17
−59.60	−58.50	−122.44	− 78.40	−162.73	−52.51	−30.24	+28.41	−55.79	+55.07	−53.14	+16.16	− .38	− .40	− .40
−35.46	−34.56	− 93.57	−135.55	−121.70	−71.85	−19.98	− 4.77	−48.55	−45.70	−61.60	−27.96	+ .38	+ .34	+ .34
− 5.99	− 5.80	− 78.64	−172.10	− 62.38	−80.27	+24.98	+29.31	−46.90	−67.42	+36.86	−23.70	− .18	− .26	− .26
−72.22	−73.14	−146.22	+114.52	−137.97	+32.00	−12.07	+20.70	−35.25	+78.18	− 3.31	+33.00	+ .14	+ .13	+ .13
−79.80	−80.01	−159.83	+ 58.74	−171.55	+ 4.28	−35.17	+15.97	−68.53	+20.52	−75.68	− 1.53	+ .15	+ .16	+ .15
+69.66	+68.68	−140.14	−139.03	+124.08	−43.86	+34.27	+ 8.28	−68.76	− 2.13	+79.20	+ 9.92	+ .20	+ .19	+ .19
+ 6.08	+ 6.25	− 82.50	+168.27	+ 63.46	+79.42	+16.70	− 2.86	−46.10	+56.03	+56.81	+31.90	− .07	− .03	− .03
−55.12	−56.36	−119.82	+162.10	− 81.90	+58.71	−27.18	− 2.38	−59.32	−31.88	−73.42	−23.86	− .03	+ .01	+ .01
−78.10	−77.44	−156.06	− 13.12	−187.37	−29.29	− 3.44	+13.10	−34.41	+78.41	+17.30	+36.17	+ .10	+ .04	+ .04
− 5.25	− 5.13	− 83.44	−180.17	− 66.51	−85.29	+33.85	+30.75	−61.88	−51.96	+61.66	−13.79	+ .13	+ .03	+ .03
+52.99	+51.82	−115.78	−177.87	+ 70.36	−66.77	−25.37	+32.51	−47.10	+72.72	−35.08	+26.47	.00	+ .05	+ .05
+62.00	+63.20	−131.44	+ 75.36	+168.43	+54.37	− 7.81	+18.17	−34.87	+80.62	+ 8.43	+36.08	.00	+ .12	+ .12
−36.45	−35.63	−101.28	−143.00	−131.03	−79.31	+ 2.13	+ 9.08	−36.49	+75.74	+30.38	+37.36	− .01	− .08	− .08
+62.90	+63.98	−136.04	+ 72.46	+171.83	+58.13	−20.43	+32.96	−40.42	+80.00	−17.44	+32.42	− .09	+ .05	+ .05
+34.72	+35.48	−103.42	+133.07	+128.70	+77.69	−35.99	+12.92	−72.05	− 0.35	−81.92	−13.26	− .15	− .01	− .01
−87.22	−87.58	−174.46	+ 56.65	−180.50	− 4.55	−21.90	+ 1.00	−54.00	−46.90	−66.99	−31.60	− .31	− .33	− .34
+32.42	+31.35	− 96.32	−193.90	+ 0.97	−83.85	+ 0.65	+14.46	−35.69	−76.80	−27.36	−38.48	+ .23	+ .21	+ .21
+80.98	+79.65	−157.04	−134.47	+131.28	−35.10	− 3.05	+12.21	−36.67	−71.94	−35.08	−38.16	− .09	− .03	− .03
−38.13	−39.50	− 99.47	+178.57	− 13.19	+75.30	+34.40	+13.98	−69.30	+ 5.28	+79.14	+16.35	− .10	− .12	− .12
+79.74	+78.48	−154.02	−122.27	+129.75	−28.74	+16.61	+32.14	−33.90	−75.68	+ 6.82	−32.84	− .09	− .05	− .05
−79.78	−80.96	−157.01	+100.90	−138.93	+17.72	−29.13	+ 9.66	−61.40	−19.60	−72.26	−21.64	+ .07	+ .07	+ .07
−80.94	−81.20	−162.57	+ 36.97	−169.35	−15.95	+17.79	+33.16	−34.10	−74.00	+10.44	−31.55	.00	− .07	− .07
+81.05	+80.72	−161.55	− 56.62	+161.13	+ 5.58	−29.87	+11.10	−61.86	−15.46	−72.00	−19.49	− .31	− .18	− .19
+78.14	+77.96	−156.26	− 48.33	+158.57	+ 7.74	+21.37	+ 4.93	−50.36	+37.79	+60.72	+27.09	− .33	− .28	− .28

Observation Equations in x

RHEA$_5$—DIONE$_4$

Date	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$\left(\frac{da}{a}\right)_5$	$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$\left(\frac{da}{a}\right)_4$	$\frac{C-O}{n}$	v_{11}	v_{12}
1909									″	″	″
Oct. 13	−16.98	+ 43.08	− 81.14	+85.33	−28.70	+ 2.40	+ 79.66	−55.28	−0.14	+0.09	+0.03
13	−19.70	+ 45.84	− 81.46	+84.75	−25.76	+ 1.22	+ 76.62	−56.71	− .10	+ .12	+ .11
13	−22.44	+ 48.62	− 81.96	+84.07	−22.68	− 0.32	+ 73.64	−58.01	− .15	+ .07	+ .11
13	−25.16	+ 51.36	− 82.64	+83.30	−19.55	− 2.16	+ 70.87	−59.14	− .54	− .32	− .22
16	+81.22	+ 77.44	−146.14	−31.02	+ 5.42	− 23.91	+ 58.28	−62.05	− .15	+ .05	+ .02
16	+82.30	+ 75.74	−148.80	−28.06	+ 9.12	− 27.64	+ 58.02	−61.62	− .26	− .03	− .01
26	+32.78	+ 3.28	−103.60	+80.26	−61.00	− 50.39	+111.70	+11.51	− .40	+ .06	+ .07
26	+28.82	+ 5.38	− 99.90	+81.77	−61.73	− 46.34	+114.62	+ 6.55	− .55	− .09	− .10
28	−69.79	+ 7.47	−148.56	−51.36	+36.08	+ 0.30	+ 88.06	+50.48	− .39	+ .01	.00
28	−68.50	+ 6.25	−146.80	−53.07	+33.98	+ 0.21	+ 85.52	+51.91	− .39	− .01	.00
29	+41.14	+ 68.96	− 88.40	−76.15	−61.06	− 30.84	+118.64	−10.55	− .08	+ .16	+ .20
29	+43.00	+ 70.62	− 89.73	−75.12	−60.59	− 28.33	+118.54	−13.02	− .41	− .18	− .21
Dec. 20	−40.49	+ 71.26	− 79.94	+70.07	−57.73	− 46.25	+105.90	− 4.63	− .30	+ .09	+ .06
20	−41.91	+ 72.54	− 80.98	+69.22	−57.54	− 44.35	+106.40	− 6.58	− .42	− .04	− .06
1910											
Sept. 7	+70.04	− 38.14	−142.85	+47.27	+45.75	− 24.96	+ 96.54	−39.64	− .73	− .14	− .06
15	+62.92	+ 44.78	−131.06	−57.87	+31.39	− 24.25	+ 78.21	−52.58	− .22	+ .14	+ .18
16	+65.15	− 39.82	−135.92	+55.52	+12.87	+ 14.65	+ 63.58	+59.95	− .50	− .08	− .10
28	− 3.62	− 0.57	− 87.04	−86.74	−58.08	+ 21.08	+116.34	−22.12	+ .05	+ .18	+ .16
Oct. 1	−69.24	+ 47.59	−140.38	+52.79	−41.12	+ 30.53	+ 89.58	−46.84	− .24	− .22	− .16
5	−15.75	+ 19.65	− 89.38	+85.92	+52.49	+ 26.98	+107.02	+34.03	+ .02	+ .32	+ .31
10	−69.55	+ 50.14	−140.30	+53.38	+57.53	− 26.29	+114.80	−25.11	− .42	− .06	− .02
11	−65.21	− 35.82	−138.44	−58.67	−18.96	− 20.20	+ 67.92	+59.86	.00	+ .22	+ .17
Nov. 18	+87.16	+ 18.90	−173.32	+ 2.90	+39.88	+ 18.34	+ 91.30	+48.10	− .39	+ .07	+ .03
19	− 1.27	+ 12.31	− 86.32	+87.14	−59.64	+ 0.62	+120.68	−18.32	− .41	− .06	− .04
26	+19.86	+ 31.70	− 87.57	−84.25	+54.43	+ 8.42	+112.50	+29.70	− .54	− .24	− .31
Dec. 13	−79.06	− 2.60	−161.01	−30.33	−19.84	− 31.58	+ 62.11	+57.28	− .29	− .06	− .09
1911											
Sept. 13	+23.08	− 43.19	− 82.74	+81.10	−56.56	+ 15.44	+114.04	+21.10	− .16	+ .10	----
13	+20.27	− 40.40	− 81.94	+81.86	−57.69	+ 18.67	+115.24	+17.84	− .42	− .15	----
26	+80.74	− 63.60	−151.35	+29.64	+37.21	+ 51.81	+ 72.58	+49.11	− .38	+ .03	----
26	+79.71	− 65.24	−149.00	+32.31	+34.45	+ 49.87	+ 69.79	+51.08	− .30	+ .09	----
Oct. 11	−59.80	+ 16.53	−134.68	+64.11	−47.21	+ 53.96	+ 87.81	−41.34	− .32	− .02	----
11	−62.02	+ 16.01	−137.72	+61.97	−44.73	+ 53.34	+ 84.24	−44.00	− .29	.00	----
13	+51.54	+ 17.14	−124.05	−71.10	−52.47	− 2.87	+110.47	+34.66	− .27	− .06	----
18	+80.60	+ 0.88	−165.12	−35.78	+21.34	+ 35.32	+ 64.12	+59.46	− .31	+ .03	----
18	+81.66	− 1.34	−166.69	−33.29	+18.30	+ 32.38	+ 62.84	+60.47	− .45	− .13	----
23	+86.72	− 48.93	−167.32	+17.65	+63.34	+ 29.56	+123.23	+ 3.01	− .74	− .22	----
23	+86.22	− 50.94	−165.94	+20.05	+63.14	+ 32.28	+122.23	+ 5.91	− .39	+ .14	----
29	−60.92	+ 21.09	−136.32	+64.66	+13.61	+ 25.89	+ 62.70	+62.13	− .40	− .08	----
29	−63.17	+ 20.62	−139.42	+62.47	+ 9.96	+ 22.23	+ 62.04	+62.82	− .43	− .13	----
Nov. 21	−83.58	+ 6.43	−169.71	+30.06	−53.98	+ 42.15	+104.90	−33.57	− .20	+ .07	----
21	−84.41	+ 4.20	−171.02	+27.60	−52.29	+ 42.99	+101.96	−36.13	− .14	+ .13	----
30	−83.43	+ 8.38	−169.14	+28.97	+49.06	− 20.53	+103.92	−39.89	− .45	− .16	----
30	−84.18	+ 6.29	−170.34	+26.67	+50.82	− 19.55	+106.60	−37.62	− .21	+ .09	----
Dec. 17	+28.70	− 35.21	− 93.55	+81.82	+54.75	+ 32.13	+108.72	+29.33	− .28	+ .24	----
17	+25.06	− 31.93	− 91.55	+83.00	+52.48	+ 34.12	+104.68	+33.22	− .53	− .02	----
1914											
Oct. 18	−78.94	−122.79	−103.88	+30.67	−56.32	+110.62	+ 30.86	−22.38	− .22	− .21	− .21
21	+74.20	−147.80	− 43.72	+41.62	−45.16	+ 98.08	+ 14.65	−40.89	− .10	− .09	− .10
31	−18.41	− 68.68	− 61.56	+84.55	− 0.95	+ 54.58	+ 29.34	+61.95	+ .14	+ .34	+ .34
Nov. 2	−13.80	− 83.44	− 33.78	−85.69	+61.65	+105.55	+ 64.22	− 8.03	− .36	− .08	− .08
2	−12.62	− 82.55	− 34.58	−85.88	+61.82	+106.48	+ 63.16	− 6.63	− .26	+ .02	+ .02
3	+83.28	−130.99	−105.81	−24.81	−39.02	+ 62.57	+ 67.27	+48.49	− .10	− .20	− .19
3	+83.56	−131.90	−105.36	−23.85	−39.93	+ 63.49	+ 68.02	+47.74	− .07	− .17	− .16
4	+39.70	−108.38	− 23.65	+77.47	−10.88	+ 61.80	+ 20.56	−61.38	− .02	+ .04	+ .02
4	+38.84	−107.42	− 23.75	+77.91	− 9.76	+ 60.97	+ 21.35	−61.58	− .37	− .31	− .32
5	−70.44	−102.23	−109.72	+51.44	+52.02	+106.91	+ 24.25	+34.56	− .91	− .45	− .45
5	−71.04	−103.22	−109.96	+50.61	+51.35	+106.13	+ 23.34	+35.56	− .32	+ .14	+ .14
6	−61.42	−134.37	− 29.86	−62.12	−61.15	+101.90	+ 68.87	+12.97	− .02	− .18	− .18
6	−60.17	−132.84	− 29.01	−63.33	−61.55	+103.48	+ 67.57	+10.95	− .02	− .17	− .18
9	−15.63	− 69.38	− 60.10	+86.30	−60.44	+114.10	+ 43.38	−17.02	+ .02	+ .08	+ .07
9	−17.13	− 69.12	− 61.60	+86.02	−59.92	+113.96	+ 41.59	−18.75	+ .03	+ .09	+ .09
11	− 5.71	− 78.37	− 41.18	−87.77	−21.19	+ 51.81	+ 51.27	+59.30	− .07	− .14	− .13
11	− 4.53	− 77.64	− 42.10	−87.84	−22.51	+ 52.10	+ 52.66	+58.82	+ .05	− .03	− .02
13	+44.44	−114.29	− 25.20	+76.15	+63.06	+111.78	+ 58.54	+ 3.19	− .49	− .06	− .06
13	+42.99	−112.63	− 25.18	+76.97	+62.95	+112.50	+ 56.72	+ 5.15	− .44	.00	.00
17	+85.63	−157.06	− 71.97	+22.73	−60.63	+ 96.66	+ 75.57	+18.66	+ .18	+ .08	+ .08
17	+85.33	−157.08	− 70.85	+23.81	−61.01	+ 97.84	+ 74.96	+17.39	+ .16	+ .06	+ .06
21	+83.56	−126.15	−113.81	−30.62	+59.60	+ 92.48	+ 78.53	−22.68	− .07	+ .17	+ .17
21	+84.14	−127.79	−113.26	−28.98	+60.30	+ 94.40	+ 71.85	−20.75	− .31	− .06	− .06
23	−59.64	− 85.03	−106.77	+66.37	−40.99	+ 93.62	+ 18.80	−48.98	+ .38	+ .45	+ .44
23	−60.84	− 86.33	−107.77	+65.27	−39.50	+ 91.81	+ 18.19	−50.19	− .11	− .04	− .05

Observation Equations in y

RHEA$_5$—DIONE$_4$

$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_5$	$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$d(\gamma \sin \theta)_4$	$d(\gamma \cos \theta)_4$	$\left(\frac{da}{a}\right)_4$	$\frac{C-O}{n}$	v_{11}	v_{12}
												″	″	″
+16.80	−33.02	− 7.21	−84.60	−10.14	+ 3.56	−11.23	+20.08	+11.58	+42.25	+44.00	+ 5.75	+0.14	+0.14	+0.15
+16.68	−32.94	− 6.66	−84.88	− 7.44	+ 4.09	−11.51	+20.69	+11.34	+44.50	+41.72	+ 5.16	+ .20	+ .19	+ .21
+16.54	−32.82	− 6.12	−85.08	− 4.68	+ 4.63	−11.77	+21.29	+11.03	+46.68	+39.27	+ 4.53	− .12	− .14	− .12
+16.37	−32.68	− 5.58	−85.20	− 1.92	+ 5.16	−12.00	+21.85	+10.66	+48.71	+36.72	+ 3.90	− .20	− .22	− .21
− 5.87	−19.80	− 0.84	+53.75	−66.07	−15.97	−12.46	+24.09	+ 6.48	+59.28	+14.44	− 1.16	+ .02	− .01	− .05
− 5.29	−19.28	− 1.17	+51.32	−67.96	−16.17	−12.37	+24.14	+ 5.73	+60.04	+10.88	− 1.90	+ .10	+ .06	+ .04
+15.35	−27.11	−15.62	−64.22	−55.70	− 6.04	+ 2.18	+12.53	+ 2.11	−29.74	+53.11	+11.94	− .13	− .11	− .11
+15.63	−27.80	−15.21	−66.86	−52.49	− 5.28	+ 1.21	+11.96	+ 2.91	−25.36	+55.34	+12.07	+ .05	+ .08	+ .09
− 9.90	−18.39	−15.00	+25.62	+81.04	+13.08	+ 9.86	+17.05	+12.11	−35.70	−49.29	− 6.96	+ .06	+ .02	+ .02
−10.22	−18.72	−15.23	+27.63	+80.39	+12.83	+10.13	+17.54	+12.08	−37.68	−47.79	− 6.55	+ .04	.00	− .02
−14.28	−29.46	− 3.27	+83.74	−14.07	− 7.96	− 2.11	+10.96	+ 6.15	− 9.22	+60.08	+11.84	− .07	+ .09	+ .10
−14.07	−29.20	− 2.96	+83.34	−16.12	− 8.31	− 2.59	+10.98	+ 6.63	− 6.78	+60.41	+11.74	− .28	− .12	− .11
+12.26	−25.26	− 4.10	−78.26	+14.43	+ 7.33	− 0.90	+ 9.11	+ 5.49	−11.42	+55.80	+10.48	+ .01	+ .08	+ .04
+12.11	−25.07	− 3.88	−77.94	+16.03	+ 7.58	− 1.26	+ 9.02	+ 5.83	− 9.53	+56.14	+10.44	− .08	− .01	− .05
+14.31	−33.50	−12.10	−40.70	−69.32	−21.21	−12.18	+26.08	−10.54	+42.81	−38.52	−14.10	+ .01	− .09	− .08
−17.40	−37.68	+12.18	+58.83	−56.22	−18.91	−16.04	+32.18	− 9.32	+53.21	−23.80	− 9.62	+ .24	+ .14	+ .15
+16.66	−36.28	−13.34	−48.73	−65.32	−19.56	+18.30	+36.71	+ 2.69	−55.24	−18.82	− 3.90	+ .47	+ .33	+ .34
−25.68	−51.29	− 2.86	+82.22	+ 9.29	+ 1.07	− 6.69	+21.10	+ 6.21	+14.84	+57.34	+17.47	− .09	− .07	− .06
+15.57	−35.58	+10.98	−55.02	+62.21	+20.42	−14.06	+29.21	+ 9.43	+40.12	+43.86	+12.30	+ .03	− .02	− .02
+25.20	−50.55	+ 2.20	−82.90	+ 8.79	+ 4.62	+10.17	+24.05	+ 8.92	−26.87	−53.32	−15.63	+ .06	− .01	.00
+15.53	−35.59	+10.37	−56.11	+62.16	+20.24	− 7.40	+21.72	− 6.14	+29.72	−52.06	−17.04	+ .03	− .04	− .04
−17.05	−36.11	−14.75	+50.84	+66.58	+18.94	+17.67	+35.55	− 4.20	−58.78	+11.90	+ 5.63	+ .09	.00	+ .01
+ 0.83	−23.61	− 3.83	+ 6.74	−83.44	−23.86	+13.42	+26.31	+12.32	−42.07	−42.76	−11.09	− .31	− .38	− .38
+23.82	−47.31	− 5.72	−83.28	− 8.36	+ 0.37	− 5.13	+17.99	+ 7.53	+11.74	+58.75	+16.59	− .08	− .11	− .10
−22.83	−45.96	− 1.13	+82.66	− 9.32	− 5.41	+ 8.22	+19.64	+10.48	−23.28	−54.84	−15.00	.00	+ .01	+ .01
− 8.12	−23.98	−11.60	+19.40	+79.12	+21.11	+15.57	+31.59	+ 1.17	−56.56	+14.21	+ 5.42	+ .03	− .06	− .05
+30.10	−60.47	+ 6.58	−77.73	− 7.69	− 8.77	+ 7.95	+22.02	−14.82	−13.64	+54.23	+21.26	+ .14	+ .17	----
+30.38	−60.78	+ 7.61	−77.94	− 5.01	− 7.72	+ 6.72	+21.58	−13.61	−10.53	+54.93	+21.67	− .04	− .01	----
+10.76	−36.81	− 1.65	−40.25	−68.84	−29.90	+18.33	+39.22	+ 0.19	−49.41	−28.69	−13.92	− .18	− .05	----
+11.76	−37.68	− 2.26	−42.52	−67.47	−29.53	+19.07	+40.26	− 0.54	−50.91	−25.93	−12.89	+ .22	+ .35	----
+23.58	−44.93	+26.03	−49.30	+64.80	+21.73	−15.28	+35.06	+ 3.07	+43.76	+38.48	+17.48	− .28	− .18	----
+22.81	−43.83	+25.84	−47.00	+66.50	+22.54	−16.26	+36.38	+ 2.85	+45.92	+35.89	+16.56	− .13	− .03	----
−26.07	−48.98	+25.88	+57.10	−58.28	−18.66	+12.81	+26.90	−17.58	−25.56	+52.53	+19.37	− .04	− .09	----
−13.19	−34.36	+19.24	+20.54	−79.34	−29.23	+21.87	+44.36	− 2.62	−57.40	−12.38	− 7.87	− .17	− .09	----
−12.28	−33.79	+18.44	+18.09	−79.95	−29.62	+22.24	+44.84	− 3.70	−57.95	− 9.45	− 6.75	− .13	− .05	----
+ 6.20	−33.78	+ 0.35	−29.06	−77.00	−31.44	+ 1.08	+22.98	− 3.86	−10.59	−58.02	−23.20	− .22	− .12	----
+ 7.07	−34.30	− 0.38	−31.20	−76.17	−31.26	+ 2.14	+23.35	− 2.85	−13.23	−57.48	−23.13	− .17	− .06	----
+23.42	−45.49	+24.49	−50.75	+65.30	+21.79	+22.03	+45.36	− 4.01	−59.00	− 4.86	− 4.98	− .03	− .01	----
+22.62	−44.35	+24.32	−48.41	+67.05	+22.61	+22.88	+45.59	− 5.34	−59.20	− 1.40	− 3.65	− .09	− .08	----
+10.77	−33.32	+14.74	−17.58	+81.06	+29.39	−11.96	+30.04	+ 6.38	+37.82	+45.75	+19.26	− .15	− .10	----
+ 9.90	−32.85	+13.95	−15.21	+81.55	+29.69	−12.87	+31.08	+ 6.68	+39.97	+43.88	+18.66	+ .01	+ .07	----
+10.30	−32.92	+13.71	−17.27	+80.72	+29.11	−14.14	+30.02	−14.10	+30.76	−60.47	−17.35	− .16	− .17	----
+ 9.50	−32.49	+12.97	−15.04	+81.17	+29.38	−13.33	+29.07	−13.75	+28.44	−51.81	−17.98	+ .31	+ .30	----
+28.24	−57.22	− 4.30	−79.14	−18.12	−10.08	+10.25	+27.06	+ 7.48	−34.41	−46.89	−19.18	− .08	+ .02	----
+28.65	−57.90	− 3.18	−79.84	−14.62	− 8.83	+11.61	+28.48	+ 8.17	−37.72	−44.27	−18.39	− .30	− .20	----
+13.89	− 9.53	+43.30	+43.60	+62.37	+34.56	− 9.82	+21.46	−23.22	+52.32	+15.12	+24.78	+ .03	+ .03	+ .03
+17.93	−36.31	+32.32	−76.23	− 5.96	−32.84	−17.97	+29.14	−28.94	+54.58	− 4.36	+19.88	+ .19	+ .09	+ .09
+37.30	−30.75	+68.42	−28.44	+72.36	+ 7.66	+27.27	+24.69	−48.62	−32.79	+44.98	+ 0.40	− .18	− .03	− .05
−37.66	−43.31	+61.96	+53.07	−57.12	+ 6.51	− 3.56	+ 9.76	−26.30	−39.96	−39.01	−27.14	− .41	− .23	− .24
−37.75	−42.96	+62.36	+52.28	−57.84	+ 6.00	− 2.94	+10.23	−25.90	−40.84	−38.09	−27.21	+ .04	+ .22	+ .21
−11.35	−11.53	+41.43	−49.82	−60.10	−36.54	+21.36	+ 8.64	−45.22	+ 1.94	+55.88	+17.16	+ .08	+ .14	+ .14
−10.92	−11.72	+41.04	−50.49	−59.53	−36.67	+21.04	+ 8.32	−44.82	+ 2.99	+55.84	+17.56	− .35	− .30	− .30
+33.91	−48.06	+51.10	−68.32	+38.03	−17.88	−27.04	+29.44	−45.60	+40.85	−38.30	+ 4.82	− .01	− .09	− .09
+34.11	−48.02	+51.52	−67.90	+38.78	−17.50	−27.11	+29.09	−45.97	+40.15	−39.04	+ 4.32	+ .09	+ .01	+ .01
+23.02	−10.42	+54.38	+26.88	+73.58	+30.76	+15.21	+28.03	−25.78	−56.02	− 3.08	−22.92	− .20	+ .01	+ .01
+22.67	−10.31	+53.95	+27.74	+73.26	+31.03	+15.65	+28.44	−26.13	−56.07	− 2.00	−22.63	+ .09	+ .30	+ .30
−27.05	−45.66	+39.89	+76.90	−15.67	+27.37	+ 5.73	+ 8.58	−27.98	+37.08	+42.17	+26.94	+ .08	+ .14	+ .14
−27.58	−46.04	+40.54	+76.56	−17.20	+26.83	+ 4.84	+ 9.16	−27.30	+38.45	+40.94	+27.12	− .10	− .04	− .04
+38.12	−33.32	+68.86	−31.53	+72.18	+ 6.45	− 7.48	+20.50	−22.67	+52.69	+20.08	+26.64	+ .20	+ .09	+ .09
+38.00	−32.66	+69.00	−30.28	+72.71	+ 7.11	− 8.24	+21.29	−22.74	+53.25	+18.57	+26.42	+ .17	+ .07	+ .09
−38.67	−42.09	+64.96	+48.25	−62.55	+ 2.97	+26.16	+17.52	−50.16	−16.41	+54.13	+ 9.33	− .28	− .07	− .07
−38.71	−41.68	+65.28	+47.41	−63.20	+ 2.45	+25.94	+16.92	−50.04	−15.20	+54.48	+ 9.91	− .15	+ .06	+ .06
+33.36	−49.39	+49.11	−71.30	+34.41	−19.99	+ 1.38	+14.77	−23.76	−47.24	−31.36	−27.83	+ .01	+ .04	+ .04
+33.73	−49.41	+49.84	−70.63	+35.74	−19.36	+ 2.25	+15.57	−23.42	−48.19	−29.88	−27.78	+ .20	+ .23	+ .23
+ 9.59	−29.47	+30.62	−75.08	−26.21	−37.92	+ 8.26	+ 8.18	−30.38	+33.88	+45.78	+26.77	− .03	− .11	− .11
+10.07	−29.97	+30.61	−75.41	−25.25	−37.79	+ 7.70	+ 8.45	−29.86	+34.83	+45.05	+26.94	+ .19	+ .10	+ .11
−13.96	−12.13	+44.55	−46.50	−64.94	−36.77	−10.05	+ 7.89	−32.18	−31.05	−48.07	−26.34	− .24	− .17	− .17
−13.24	−12.36	+43.82	−47.76	−64.01	−37.04	− 9.19	+ 8.20	−31.32	−32.58	−47.04	−26.65	+ .04	+ .11	+ .11
+29.65	−15.95	+62.77	+10.58	+79.38	+26.03	−21.65	+34.76	−31.56	+55.65	−13.67	+18.14	.00	− .02	− .02
+29.17	−15.51	+62.21	+12.01	+79.17	+26.57	−22.19	+35.04	−32.38	+55.23	−15.34	+17.49	+ .01	.00	− .01

Observation Equations in x

RHEA$_5$—DIONE$_4$—Continued

Date	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$\left(\frac{da}{a}\right)_5$	$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$\left(\frac{da}{a}\right)_4$	$\frac{C-O}{n}$	v_{11}	v_{12}
1914									″	″	″
Dec. 14	+90.10	−151.91	− 97.16	+ 7.01	−21.66	+ 48.15	+ 57.25	+61.00	−0.28	−0.32	−0.31
14	+89.97	−152.48	− 95.94	+ 8.38	−23.18	+ 48.33	+ 58.87	+60.44	+ .07	+ .03	+ .03
15	− 7.98	− 70.13	− 58.74	+90.08	−12.30	+ 62.24	+ 27.85	−63.57	− .34	− .26	− .27
15	− 8.96	− 69.73	− 59.63	+89.99	−11.16	+ 61.29	+ 28.51	−63.78	− .34	− .26	− .27
16	−90.35	−150.72	− 99.79	− 5.01	+46.28	+ 98.98	+ 28.72	+45.34	− .30	+ .05	+ .05
16	−90.28	−151.18	− 98.91	− 6.00	+45.44	+ 98.01	+ 28.06	+46.17	− .30	+ .04	+ .04
17	−32.32	−100.76	− 34.12	−84.50	−57.76	+ 80.81	+ 87.58	+29.28	.00	− .21	− .21
17	−30.84	− 99.22	− 34.50	−85.06	−58.59	+ 82.69	+ 87.47	+27.59	+ .25	+ .04	+ .04
22	+21.10	− 65.39	− 72.42	−87.97	+ 6.94	+ 57.34	+ 32.46	+64.41	− .20	− .11	− .10
22	+22.64	− 65.16	− 74.00	−87.59	+ 5.06	+ 55.99	+ 33.76	+64.59	− .11	− .03	− .02
1915											
Jan. 2	+ 3.82	− 74.36	− 51.45	+90.10	−13.94	+ 45.37	+ 51.91	+63.05	− .17	− .08	− .08
2	+ 1.75	− 73.01	− 53.01	+90.17	−16.31	+ 44.93	+ 54.31	+62.48	+ .06	+ .14	+ .14
8	−80.91	−150.22	− 71.79	−39.16	−63.62	+ 93.76	+ 86.53	+ 9.48	+ .15	− .05	− .05
8	−80.05	−149.71	− 69.96	−40.86	−63.92	+ 95.58	+ 85.19	+ 7.26	+ .38	+ .19	+ .18
9	+15.38	− 63.64	− 68.70	−88.46	+25.83	+ 43.56	+ 65.11	−58.89	+ .01	− .03	− .03
9	+21.58	− 62.10	− 74.85	−87.15	+32.48	+ 45.54	+ 72.30	−55.49	+ .18	+ .17	+ .16
9	+23.02	− 61.86	− 76.31	−86.78	+33.98	+ 46.22	+ 73.91	−54.58	− .06	− .07	− .07
13	−42.10	−108.81	− 38.59	−78.98	−16.67	+ 42.74	+ 55.80	+61.87	+ .16	+ .06	+ .07
13	−41.08	−107.65	− 38.53	−79.52	−17.98	+ 12.55	+ 57.14	+61.50	+ .09	− .01	− .01
15	+65.00	−134.62	− 50.20	+61.23	+62.73	+104.49	+ 70.59	+12.53	− .35	+ .04	+ .03
15	+63.96	−133.48	− 49.21	+62.31	+62.36	+104.96	+ 68.87	+14.27	− .28	+ .11	+ .11
28	+87.88	−133.07	−114.86	− 3.30	+ 9.18	+ 42.10	+ 49.50	−62.33	+ .23	+ .20	+ .19
28	+87.92	−133.94	−113.95	− 2.03	+10.65	+ 41.51	+ 50.87	−62.09	+ .05	+ .02	+ .01
Feb. 9	−52.12	−116.56	− 45.11	−68.96	+35.98	+ 80.45	+ 35.26	+50.35	− .40	− .19	− .18
9	−51.26	−115.58	− 44.69	−69.59	+34.96	+ 79.30	+ 34.77	+51.07	− .01	+ .19	+ .20
10	+54.73	− 64.21	−110.90	−66.68	−61.77	+ 90.45	+ 84.16	− 0.67	+ .17	.00	+ .01
10	+55.88	− 65.16	−112.07	−65.72	−61.73	+ 91.60	− 82.82	− 2.45	+ .06	− .10	− .10
18	−61.84	−126.00	− 53.37	−58.53	−51.13	+ 55.22	+ 92.24	+33.14	+ .35	+ .10	+ .10
18	−60.81	−124.92	− 52.36	−59.60	−52.07	+ 56.86	+ 92.80	+31.66	+ .46	+ .21	+ .21
Mar. 1	+79.75	−135.27	− 87.98	+24.53	−51.26	+ 54.62	+ 92.05	+30.69	+ .36	+ .18	+ .18
1	+79.34	−135.42	− 86.67	+25.79	−52.05	+ 56.12	+ 92.46	+29.34	− .03	− .21	− .21
9	+39.53	− 52.87	− 93.01	−72.08	−36.46	+ 36.50	+ 78.24	+46.22	+ .08	− .10	− .09
9	+40.53	− 53.20	− 94.11	−71.51	−37.52	+ 37.22	+ 79.38	+45.36	+ .54	+ .36	+ .36
13	−25.30	− 82.96	− 41.24	−77.60	+15.42	+ 32.87	+ 55.22	−56.38	+ .04	− .05	− .06
13	−24.08	− 81.71	− 41.53	−77.99	+16.89	+ 32.51	+ 56.70	−55.96	+ .19	+ .10	+ .09
18	+32.30	− 50.69	− 84.23	−74.11	−38.49	+ 78.62	+ 40.19	−43.24	− .14	− .23	− .23
18	+33.40	− 50.82	− 85.43	−73.62	−37.42	+ 77.51	+ 39.32	−44.17	+ .30	+ .21	+ .21
Apr. 6	+77.49	−123.85	− 93.68	+10.07	−49.50	+ 85.38	+ 56.50	−26.11	+ .24	+ .15	+ .15
6	+77.32	−124.33	− 92.63	+11.23	−48.83	+ 85.12	+ 55.13	−27.32	+ .30	+ .21	+ .21

RHEA$_5$—TETHYS$_3$

Date	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$\left(\frac{da}{a}\right)_5$	$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$\left(\frac{da}{a}\right)_3$	$\frac{C-O}{n}$	v_{11}	v_{12}
1909									″	″	″
Oct. 22	− 8.82	+ 36.06	− 80.48	+86.42	+26.62	+ 1.50	+66.94	+40.63	−0.14	0.00	0.00
22	−11.48	+ 38.74	− 80.24	+86.10	+23.54	+ 0.88	+63.41	+42.48	− .11	.00	.00
30	+81.42	+ 27.82	−163.08	+29.13	−44.43	−47.42	+77.54	+19.11	− .52	.00	.00
30	+80.54	+ 25.48	−162.14	+31.50	−45.66	−45.89	+80.54	+15.96	− .49	.00	.00
Dec. 20	−46.58	+ 76.58	− 84.82	+66.16	−43.15	−57.18	+66.04	+13.51	− .34	.00	.00
20	−47.80	+ 77.56	− 85.96	+65.28	−43.71	−56.32	+67.87	+11.56	− .25	.00	.00
1910											
Sept. 7	+67.90	− 39.40	−139.37	+50.30	− 6.07	+14.06	+46.33	−46.87	− .17	− .01	− .04
9	−78.10	− 28.94	−157.05	−33.06	+24.24	−10.94	+62.38	−40.75	− .05	.00	+ .01
15	+61.14	+ 44.87	−128.46	−59.75	+47.30	+ 6.08	+94.67	− 6.97	+ .32	+ .12	+ .12
17	−31.71	+ 31.32	− 96.88	+79.66	+47.76	+16.31	+94.21	+ 4.12	− .16	+ .01	+ .01
29	+86.24	+ 16.70	−172.00	−10.46	−39.58	−16.82	+82.32	+28.16	− .36	− .06	− .03
Oct. 1	−75.82	+ 43.37	−151.51	+42.85	−46.06	− 8.77	+93.04	+15.72	− .53	− .08	− .07
Nov. 25	−76.50	− 14.62	−157.66	−40.75	−47.57	− 9.58	+95.09	− 9.14	− .08	+ .09	+ .08
26	+17.64	+ 29.52	− 86.90	−84.74	+48.04	−13.05	+95.39	+ 6.08	+ .18	− .10	− .09
Dec. 25	+22.58	− 6.18	− 91.58	+79.91	−35.23	−44.71	+62.29	+30.23	− .39	+ .08	+ .08
1911											
Sept. 11	+ 2.07	− 18.19	− 82.13	−84.02	+20.62	+40.92	+42.54	+42.23	.00	− .02	----
11	+ 4.31	− 16.07	− 82.83	−83.94	+17.89	+38.16	+41.39	+43.46	+ .29	+ .28	----
16	+48.20	+ 12.05	−118.34	−69.67	+12.19	+10.24	+50.85	−45.78	− .06	− .08	----
16	+50.32	+ 12.28	−120.94	−68.16	+15.52	+ 8.42	+53.82	−44.77	− .11	− .13	----
20	−11.27	− 31.02	− 81.80	−84.53	+39.09	+11.40	+82.03	−27.31	+ .12	.00	----
20	− 8.54	− 28.26	− 81.81	−84.85	+41.09	+14.14	+84.48	−24.21	+ .17	+ .05	----
26	+81.94	− 61.24	−154.23	+26.10	+44.59	+49.27	+76.48	+18.06	.00	+ .17	----
26	+81.28	− 62.61	−152.64	+28.11	+43.45	+50.25	+73.84	+20.65	− .30	− .13	----
Oct. 11	−71.90	+ 10.34	−151.94	+50.20	+42.36	+47.20	+74.57	+24.66	− .11	− .03	----
12	−65.03	− 70.34	−124.28	−58.96	−40.33	+47.34	+71.01	−27.91	+ .10	+ .10	----
12	−63.93	− 70.14	−122.68	−60.14	−39.06	+47.34	+68.86	−29.65	− .07	− .08	----
Nov. 5	+68.77	+ 20.32	−147.28	−56.43	+12.83	+22.76	+49.52	+48.08	− .14	+ .02	----
5	+69.71	+ 19.80	−148.66	−55.27	+10.90	+20.84	+48.96	+48.55	− .18	− .02	----
16	−51.83	+ 25.21	−123.84	+72.30	+42.37	+34.48	+81.66	+26.04	− .17	− .02	----
16	−53.28	+ 25.52	−125.62	+71.23	+41.06	+35.12	+79.35	+28.06	− .17	− .02	----
25	−41.02	+ 23.00	−111.22	+78.54	+20.30	−12.47	+59.46	−45.18	− .11	− .05	----
25	−42.22	+ 23.61	−112.44	+77.90	+21.96	−13.49	+60.98	−44.40	− .05	+ .01	----
Dec. 1	−43.68	− 49.89	−104.97	−76.66	+48.75	+14.64	+96.69	+ 7.54	+ .06	− .05	----
1	−42.17	− 48.82	−103.60	−77.50	+48.34	+16.74	+95.72	+ 9.82	+ .14	+ .03	----

Observation Equations in y

RHEA$_5$—DIONE$_4$—Continued

$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_5$	$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$d(\gamma \sin \theta)_4$	$d(\gamma \cos \theta)_4$	$\left(\frac{da}{a}\right)_4$	$\frac{C-O}{n}$	v_{11}	v_{12}
												″	″	″
+ 2.66	−24.88	+31.94	−69.33	−41.78	−40.13	+27.17	+22.97	−50.16	−16.66	+55.54	+ 9.62	−0.12	−0.01	−0.01
+ 3.27	−25.43	+31.67	−69.95	−40.71	−40.09	+26.92	+22.25	−50.08	−15.26	+55.94	+10.30	+ .18	+ .28	+ .28
+40.15	−42.70	+68.06	−41.15	+69.77	+ 3.09	−28.31	+36.35	−43.78	+42.57	−39.41	+ 5.50	− .06	− .11	− .11
+40.12	−42.31	+68.24	−40.40	+70.21	+ 3.53	−28.41	+36.06	−44.20	+41.86	−40.16	+ 4.99	+ .33	+ .28	+ .28
− 1.76	−24.29	+32.32	+68.36	+43.55	+40.26	+20.18	+36.22	−27.28	−57.45	+ 8.22	−20.64	− .73	− .44	− .43
− 2.21	−24.68	+32.10	+68.85	+42.79	+40.24	+20.56	+36.52	−27.72	−57.29	+ 9.27	−20.26	− .14	+ .16	+ .16
−37.47	−53.96	+54.08	+67.70	−44.53	+14.84	+13.07	+10.16	−35.25	+26.20	+51.76	+25.74	− .02	+ .08	+ .07
−37.73	−53.80	+54.78	+66.90	−45.73	+14.18	+12.31	+10.21	−34.41	+27.70	+50.97	+26.10	− .19	− .10	− .10
−39.36	−38.16	+69.44	+31.07	−74.82	− 8.96	+28.75	+35.90	−45.03	−39.15	+42.80	− 3.12	− .20	+ .07	+ .08
−39.19	−37.46	+69.54	+29.75	−75.34	− 9.65	+28.83	+35.32	−45.64	−37.89	+43.92	− 2.28	− .34	− .06	− .06
+40.32	−49.64	+63.60	−50.94	+62.55	− 2.17	+28.26	+29.52	−48.59	−23.41	+52.82	+ 6.22	− .12	− .02	− .02
+40.36	−48.95	+64.21	−49.50	+63.69	− 1.25	+28.00	+28.46	−48.79	−21.40	+53.67	+ 7.28	− .48	− .39	− .38
−17.15	−41.10	+28.61	+78.83	+15.70	+36.49	+ 4.28	+15.03	−25.74	+40.78	+40.56	+28.56	+ .01	+ .07	+ .07
−17.92	−41.93	+28.82	+79.14	+14.03	+36.12	+ 3.28	+15.63	−24.94	+42.17	+39.11	+28.69	− .26	− .20	− .20
−39.77	−43.04	+67.20	+36.77	−71.34	− 6.45	−26.44	+24.84	−48.12	+12.62	−56.08	−11.58	− .12	− .01	.00
−39.20	−40.30	+67.91	+31.66	−73.75	− 9.23	−24.92	+21.61	−47.22	+ 6.03	−57.16	−14.57	− .16	− .04	− .04
−39.04	−39.64	+68.02	+30.41	−74.27	− 9.88	−24.52	+20.89	−46.92	+ 4.47	−57.31	−15.24	− .29	− .18	− .17
−35.26	−56.85	+45.96	+72.74	−33.30	+19.32	+27.82	+29.64	−47.67	−20.77	+53.37	+ 7.47	− .02	+ .24	+ .24
−35.50	−56.90	+46.48	+72.30	−34.22	+18.86	+27.65	+29.04	−47.75	−19.63	+53.79	+ 8.06	− .11	+ .15	+ .15
+27.18	−51.72	+33.94	−79.38	+ 8.12	−29.53	+ 5.62	+23.28	−19.51	−51.81	−24.19	−28.23	− .15	− .09	− .09
+27.68	−52.18	+34.45	−79.23	+ 9.46	−29.07	+ 6.40	+24.05	−19.30	−52.46	−22.75	−28.06	− .04	+ .02	+ .02
− 1.94	−23.55	+32.08	−60.08	−50.58	−39.60	−28.13	+34.27	−44.82	+26.16	−49.80	− 4.12	+ .04	+ .06	+ .06
− 1.37	−23.96	+31.69	−60.78	−49.71	−39.63	−28.02	+33.65	−45.08	+24.98	−50.42	− 4.78	+ .04	+ .06	+ .06
−30.90	−55.28	+36.56	+74.57	−19.66	+23.91	+22.77	+41.46	−24.92	−52.26	+17.84	−16.30	− .16	+ .15	+ .15
−31.20	−55.48	+36.99	+74.33	−20.58	+23.53	+23.10	+41.68	−25.44	−51.89	+18.89	−15.83	− .34	− .03	− .03
−30.42	−25.74	+60.28	− 1.64	−76.95	−24.40	− 0.28	+19.34	−20.18	+45.20	+31.56	+27.95	− .12	− .12	− .12
−29.99	−25.20	+59.86	− 2.98	−76.91	−24.92	− 1.09	+19.95	−19.66	+46.08	+30.24	+27.93	− .11	− .11	− .11
−26.17	−51.13	+30.42	+75.61	− 7.02	+28.29	+15.03	+15.83	−34.49	+20.35	+50.40	+23.16	+ .04	+ .16	+ .16
−26.67	−51.60	+30.92	+75.50	− 8.34	+27.83	+14.35	+15.58	−33.74	+21.79	+49.78	+23.58	− .28	− .16	− .16
+10.71	−34.44	+24.24	−69.56	−26.36	−36.27	+13.94	+15.80	−32.68	+22.46	+48.31	+23.25	.00	− .02	− .02
+11.28	−35.04	+24.17	−69.97	−25.25	−36.09	+13.32	+15.61	−32.00	+23.71	+47.69	+23.60	− .13	− .16	− .16
−32.91	−31.64	+60.31	+11.16	−72.43	−17.56	+20.99	+21.78	−39.52	+ 4.50	+52.29	+16.54	− .04	+ .10	+ .10
−32.65	−31.14	+60.16	+10.14	−72.57	−18.02	+20.61	+21.25	−39.19	+ 5.71	+52.16	+17.02	+ .08	+ .21	+ .21
−35.09	−54.46	+45.81	+59.85	−41.38	+11.88	−25.60	+32.04	−40.55	+15.76	−49.67	− 6.98	+ .03	+ .16	+ .16
−35.26	−54.32	+46.38	+59.19	−42.32	+11.33	−25.40	+31.36	−40.71	+14.45	−50.06	− 7.65	− .19	− .06	− .06
−33.79	−34.32	+59.93	+16.69	−70.09	−14.28	−19.63	+38.54	−19.02	+49.60	−14.27	+17.49	− .26	− .22	− .22
−33.58	−33.78	+59.88	+15.65	−70.34	−14.78	−20.04	+38.93	−19.52	+49.22	−15.47	+17.00	+ .14	+ .18	+ .18
+ 4.17	−26.34	+24.80	−61.59	−32.56	−35.20	−11.84	+29.64	−13.69	+49.87	+ 1.47	+22.47	− .03	− .10	− .13
+ 4.70	−26.82	+24.57	−62.07	−31.63	−35.13	−12.39	+30.25	−13.80	+49.89	+ 0.24	+22.17	+ .46	+ .39	+ .38

RHEA$_5$—TETHYS$_3$

$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_5$	$d\epsilon_3$	$(e \sin \pi)_3$	$(e \sin \pi)_3$	$d(\gamma \cos \theta)_3$	$d(\gamma \cos \theta)_3$	$\left(\frac{da}{a}\right)_3$	$\frac{C-O}{n}$	v_{11}	v_{12}
												″	″	″
+16.61	−32.00	− 9.12	−83.04	−18.71	+ 1.91	+ 8.91	+15.08	+10.76	−29.30	−37.54	− 5.06	− .24	0.00	0.00
+16.54	−32.03	− 8.60	−83.59	−16.14	+ 2.42	+ 9.26	+15.82	+10.59	−31.98	−35.27	− 4.39	− .08	.00	.00
+ 5.69	−15.35	−11.26	− 1.18	−84.84	−15.26	+ 3.34	+11.43	+ 1.66	−31.16	+35.78	+ 9.42	− .08	.00	.00
+ 6.13	−15.53	−11.70	− 3.66	−84.76	−15.09	+ 2.67	+10.83	+ 2.02	−28.58	+37.88	+ 9.63	− .15	.00	.00
+11.55	−24.38	− 3.17	−76.63	+21.37	+ 8.39	+ 1.94	+ 8.46	+ 3.99	−20.19	+39.61	+ 8.51	+ .05	− .01	.00
+11.40	−24.18	− 3.00	−76.22	+22.80	+ 8.61	+ 1.56	+ 8.12	+ 4.18	−18.40	+40.48	+ 8.58	+ .04	+ .01	.00
+15.23	−34.56	−12.48	−43.70	−67.47	−20.57	−14.06	+28.04	− 2.30	+41.90	+16.29	+ 1.14	+ .14	− .04	− .03
− 9.99	−29.45	− 9.48	+26.70	+76.14	+23.62	−11.78	+23.05	− 9.17	+43.08	−13.36	− 7.79	+ .28	+ .10	+ .11
−17.96	−38.46	+12.22	+60.51	−54.42	−18.37	− 1.39	+14.10	− 2.66	+16.29	−42.50	−14.08	+ .38	+ .11	+ .11
+23.90	−48.08	+ 7.92	−77.66	+25.20	+ 9.51	+ 1.88	+14.50	+ 0.70	+ 5.85	−45.27	−14.02	− .01	− .06	− .05
− 3.09	−26.15	+ 2.11	+15.82	−81.30	−25.49	+ 7.63	+18.04	− 6.92	−33.32	+32.16	+11.86	− .03	+ .07	+ .08
+12.63	−32.30	+ 9.72	−46.02	+69.15	+22.36	+ 3.92	+15.10	− 4.05	−22.61	+40.53	+13.53	− .02	+ .18	+ .18
−11.08	−27.12	−13.64	+30.17	+77.60	+20.75	− 3.00	+12.42	+ 6.05	+ 6.02	+46.14	+12.45	− .21	− .17	− .17
−22.96	−46.14	− 1.72	+82.87	− 7.15	− 4.81	+ 2.19	+12.25	+ 5.29	− 3.17	−46.42	−12.59	+ .04	− .12	− .11
+21.28	−40.97	−13.00	−73.57	−31.20	− 5.98	+ 7.41	+17.55	+ 0.42	−28.30	+34.56	+ 9.42	− .31	− .10	− .09
−31.26	−60.45	+15.95	+76.24	−15.70	− 0.58	+15.12	+30.30	− 7.66	−38.57	−20.17	− 7.89	− .16	− .09	----
−31.24	−60.20	+16.74	+75.78	−17.72	− 1.41	+15.59	+30.75	− 8.65	−39.78	−17.68	− 6.91	.00	+ .06	----
−25.98	−47.79	+27.03	+55.58	−55.42	−17.74	−16.70	+28.32	−18.15	+42.55	−10.77	− 3.96	− .16	− .08	----
−25.42	−46.84	+27.12	+53.84	−57.11	−18.53	−16.37	+27.27	−18.84	+41.65	−13.87	− 5.18	− .14	− .05	----
−31.30	−61.85	+10.72	+78.92	− 3.63	+ 4.38	−10.28	+17.64	−17.42	+25.33	−36.21	−13.86	− .05	+ .09	----
−31.43	−61.85	+11.73	+78.78	− 6.18	+ 3.36	− 9.17	+16.72	−16.45	+22.45	−38.06	−14.62	− .13	+ .01	----
+ 9.45	−35.74	− 0.77	−37.22	−70.52	−30.34	+ 6.05	+20.10	− 2.68	−17.41	−41.07	−16.27	− .06	.00	----
+10.20	−36.34	− 1.28	−38.94	−69.58	−30.10	+ 7.00	+21.05	− 2.29	−19.79	−39.98	−15.89	− .04	+ .02	----
+18.52	−38.63	+23.78	−34.67	+73.69	+26.18	+ 8.35	+22.72	− 0.49	−25.00	−38.05	−15.41	+ .04	+ .05	----
−21.40	−48.67	− 5.91	+64.15	+50.32	+23.89	− 9.53	+24.07	− 0.19	+27.99	+35.94	+14.71	.00	− .05	----
−21.84	−49.25	− 5.84	+65.06	+49.14	+23.50	−10.16	+24.84	− 0.16	+29.54	+34.67	+14.28	+ .03	− .01	----
−20.33	−41.60	+22.86	+42.57	−71.12	−24.48	+16.68	+33.59	− 3.06	−45.81	− 7.12	− 5.05	− .08	− .05	----
−19.92	−41.11	+22.67	+41.36	−71.83	−24.82	+16.86	+33.80	− 3.72	−46.07	− 5.28	− 4.38	− .03	.00	----
+25.70	−49.77	+22.27	−60.26	+57.11	+18.20	+ 8.52	+22.43	+ 3.42	−29.18	−36.09	−14.99	+ .01	− .01	----
+25.33	−49.14	+22.38	−59.09	+58.32	+18.71	+ 9.23	+23.22	+ 3.68	−30.89	−34.63	−14.56	− .11	− .13	----
+27.66	−53.64	+19.66	−67.90	+47.37	+14.24	−15.78	+30.54	−10.27	+38.98	−24.96	− 6.43	− .07	− .09	----
+27.45	−53.22	+19.88	−67.16	+48.42	+14.66	−15.53	+30.02	−10.63	+38.03	−26.38	− 7.01	+ .08	+ .06	----
−26.69	−55.12	− 6.97	+76.14	+31.76	+15.42	+ 1.98	+17.24	+ 0.07	−14.22	−43.87	−16.78	− .18	− .03	----
−27.00	−55.61	− 6.60	+76.74	+30.26	+14.89	+ 2.77	+17.54	+ 0.81	−16.28	−43.16	−16.67	− .12	+ .03	----

Observation Equations in x

RHEA$_5$—TETHYS$_3$—Continued

Date	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$\left(\frac{da}{a}\right)_5$	$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)^3$	$\left(\frac{da}{a}\right)_3$	$\frac{C-O}{n}$	v_{11}	v_{12}
1912									″	″	″
Oct. 1	+44.02	− 84.58	− 77.47	+73.49	−34.87	+64.42	+42.34	−32.84	−0.12	+0.02	---
2	−56.42	− 20.70	−128.40	+64.68	+39.02	+67.31	+48.36	+27.93	+ .01	+ .11	---
2	−62.23	− 24.18	−135.65	+59.14	+31.85	+61.60	+39.38	+35.90	− .10	+ .03	---
5	+84.38	− 94.50	−140.88	+17.53	−15.46	+44.10	+33.10	−45.65	− .26	− .06	---
7	−84.72	− 64.24	−157.77	+17.46	− 3.40	+32.09	+36.64	−48.22	− .26	− .11	---
10	+55.68	− 94.78	− 88.65	+66.63	−27.36	+19.87	+64.87	+40.11	− .19	+ .05	---
10	+49.34	− 89.34	− 82.85	+71.46	−35.45	+24.76	+74.25	+33.18	− .28	− .05	---
16	−87.62	− 80.83	−155.48	− 0.81	−38.88	+65.09	+51.90	−29.75	− .05	+ .10	---
26	−37.50	− 76.72	− 78.60	−80.24	+19.86	+15.39	+58.29	−45.36	+ .04	+ .04	---
29	−55.02	− 15.02	−129.42	+69.75	−45.20	+31.54	+87.16	+20.53	− .26	− .04	---
Nov. 9	+29.18	− 16.46	−101.43	−84.59	−10.41	+15.92	+50.74	+48.94	− .03	+ .08	---
20	+ 9.23	− 44.62	− 79.51	+89.29	+41.27	+57.21	+66.00	+28.58	− .18	− .09	---
22	−51.24	− 85.73	− 92.67	−73.74	+40.58	+56.46	+65.36	+29.55	.00	.00	---
29	+20.07	− 54.08	− 79.54	+87.40	+24.86	+ 4.24	+65.98	−43.55	− .22	− .10	---
30	−78.92	− 25.91	−161.43	+42.61	−23.56	+ 4.18	+64.50	+44.24	− .28	− .02	---
Dec. 14	−88.94	− 65.89	−165.24	− 2.82	−14.46	+30.28	+46.73	−47.58	− .16	.00	---
19	−69.72	− 90.14	−119.61	−54.61	−25.34	− 2.32	+66.12	+42.52	− .23	− .05	---
27	−70.47	− 8.76	−150.09	+52.34	−35.10	+42.94	+65.24	−34.28	− .17	.00	---
1913											
Jan. 4	+53.32	− 78.58	− 99.46	+68.50	+15.20	− 2.01	+55.19	−46.11	+ .06	+ .23	---
21	+76.63	− 16.74	−156.42	−35.48	+29.89	−12.34	+69.00	−36.57	− .25	− .09	---
30	+69.36	− 6.26	−145.94	−45.80	−39.58	+30.78	+76.89	−24.35	− .16	+ .01	---
1914											
Sept. 28	+81.58	−141.98	− 80.39	+ 0.46	−32.75	+72.63	− 4.89	−31.76	+ .08	+ .12	+0.15
28	+81.53	−143.06	− 78.30	+ 2.81	−30.48	+69.55	− 5.55	−33.95	− .32	− .30	− .27
Oct. 19	−44.80	−112.96	− 21.34	−72.03	+ 7.76	+43.82	+22.58	−46.78	− .05	− .10	− .08
19	−43.33	−111.25	− 21.28	−72.93	+10.02	+43.94	+24.89	−46.35	− .28	− .34	− .31
21	+72.80	−146.38	− 41.31	+44.03	+12.82	+44.35	+28.09	−45.82	+ .16	− .07	− .01
28	−52.36	−122.76	− 23.94	−68.40	−47.56	+91.78	+26.15	− 7.40	− .50	− .17	− .19
28	−50.27	−120.22	− 23.33	−69.95	−46.91	+91.68	+22.68	−10.81	− .30	+ .02	.00
30	+78.38	−152.35	− 51.73	+36.26	−47.02	+91.76	+23.32	−10.96	− .60	− .45	− .43
31	−23.25	− 68.44	− 66.54	+83.36	+43.36	+88.35	+13.26	+21.46	− .25	− .25	− .25
31	−24.34	− 68.46	− 67.66	+83.05	+42.67	+87.52	+12.00	+22.81	+ .32	+ .31	+ .32
Nov. 2	− 2.58	− 75.98	− 42.22	−86.77	+27.42	+67.88	+ 2.34	+40.05	+ .29	+ .22	+ .16
2	− 1.48	− 75.39	− 43.13	−86.80	+26.20	+66.41	+ 2.39	+40.86	− .09	− .15	− .21
3	+84.35	−134.58	−103.84	−20.86	−23.01	+62.77	+ 3.14	−42.81	+ .17	+ .17	+ .21
3	+84.67	−135.66	−103.20	−19.64	−21.52	+61.14	+ 3.55	−43.58	− .12	− .12	− .10
4	+35.83	−104.12	− 24.22	+79.34	+14.93	+54.72	+ 6.70	+46.34	− .29	− .40	− .43
4	+34.73	−102.94	− 24.46	+79.83	+13.39	+53.38	+ 7.60	+46.80	+ .27	+ .17	+ .14
5	−74.03	−108.55	−110.78	+46.15	− 0.71	+45.43	+17.74	−48.75	− .32	− .19	− .14
5	−75.11	−110.62	−110.89	+44.37	+ 2.08	+44.44	+20.35	−48.71	− .17	− .05	− .01
9	−18.32	− 68.95	− 62.80	+85.77	+24.74	+48.19	+43.82	−42.34	+ .18	+ .18	+ .24
9	−19.45	− 68.84	− 63.97	+85.53	+26.08	+49.17	+45.03	−41.54	+ .07	+ .07	+ .13
11	−14.90	− 84.87	− 34.61	−86.68	+36.95	+60.72	+53.18	−32.46	+ .07	− .03	− .02
11	−13.62	− 83.88	− 35.44	−86.89	+38.07	+62.40	+53.62	−31.13	+ .14	+ .04	+ .05
13	+41.46	−110.88	− 25.21	+77.81	+47.75	+82.30	+49.99	−12.33	+ .01	− .18	− .15
13	+40.23	−109.49	− 25.29	+78.45	+48.18	+83.74	+48.83	−10.54	+ .21	+ .03	+ .06
16	+46.34	− 74.97	− 93.03	−75.39	−46.87	+91.46	+25.94	−15.86	.00	+ .33	+ .32
16	+48.33	− 76.24	− 95.02	−74.15	−45.77	+90.58	+22.96	−18.78	− .57	− .25	− .26
17	+80.79	−155.23	− 57.72	+36.33	+39.93	+84.02	+13.39	+29.36	+ .48	+ .20	+ .19
17	+80.26	−154.86	− 56.50	+37.50	+38.88	+82.70	+12.28	+30.73	+ .06	− .21	− .23
22	+42.06	−111.84	− 27.11	+78.56	− 2.28	+45.70	+20.26	−49.78	+ .26	+ .19	+ .25
22	+41.17	−110.84	− 27.13	+79.02	− 0.94	+45.02	+21.42	−49.82	− .02	− .10	− .03
Dec. 15	−12.68	− 68.35	− 63.12	+89.54	+47.14	+69.96	+65.80	−18.31	.00	− .03	+ .01
15	−13.92	− 67.98	− 64.33	+89.36	+47.72	+71.56	+65.34	−16.74	− .48	− .51	− .47
21	−75.77	−149.22	− 56.14	−49.49	+41.49	+83.07	+28.72	+28.95	+ .30	+ .22	+ .17
21	−75.01	−148.50	− 54.96	−50.64	+40.41	+81.96	+27.24	+30.45	− .03	− .11	− .17
26	−24.42	− 92.13	− 38.46	−87.06	+ 3.78	+38.80	+33.06	−50.41	− .13	− .15	− .12
26	−23.15	− 90.92	− 38.98	−87.41	+ 5.54	+38.03	+34.66	−50.25	− .01	− .03	− .01
1915											
Jan. 5	+68.79	− 86.27	−121.87	−58.05	+49.96	+73.67	+67.78	− 6.32	+ .32	+ .17	+ .17
5	+69.92	− 87.84	−122.68	−56.69	+50.19	+75.48	+66.28	− 3.98	+ .21	+ .06	+ .05
8	−79.23	−149.18	− 68.24	−42.46	−34.44	+72.73	+28.13	−36.57	− .02	+ .25	+ .24
8	−78.47	−148.65	− 66.78	−43.83	−32.87	+70.97	+26.96	−37.97	− .10	+ .14	+ .15
15	+78.63	−147.29	− 69.50	+42.35	+ 9.98	+45.25	+27.33	+48.94	+ .20	+ .02	− .02
15	+77.85	−146.72	− 68.00	+43.76	+ 7.86	+43.34	+28.32	+49.33	+ .30	+ .11	+ .08
21	−82.87	−110.13	−127.90	+31.90	−49.12	+66.60	+72.56	+ 6.95	− .19	+ .30	+ .27
21	−83.47	−111.81	−127.60	+30.29	−49.40	+68.52	+71.32	+ 4.67	− .44	+ .05	+ .02
29	+31.49	− 94.99	− 40.88	+82.02	−25.30	+59.04	+29.13	−42.10	− .15	− .02	+ .03
29	+30.52	− 93.96	− 41.04	+82.39	−24.10	+57.70	+28.74	−42.81	− .14	− .02	+ .04
Feb. 9	−54.20	−118.91	− 46.30	−67.33	−47.66	+69.35	+65.88	− 7.85	− .25	+ .09	+ .07
9	−53.10	−117.67	− 45.66	−68.20	−47.33	+70.20	+64.22	− 9.69	− .53	− .19	− .21

Observation Equations in y

RHEA$_5$—TETHYS$_3$—Continued

$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_5$	$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$d(\gamma \sin \theta)_3$	$d(\gamma \cos \theta)_3$	$\left(\frac{da}{a}\right)_3$	$\frac{C-O}{n}$	v_{11}	v_{12}
												″	″	″
+30.60	−61.98	+15.90	−77.24	− 7.99	−18.74	−13.71	+29.33	−11.50	+36.78	+23.07	+15.53	−0.01	+0.01	---
+27.32	−41.13	+42.87	−31.50	+71.12	+23.36	+11.52	+26.92	−10.22	−33.50	−27.74	−17.25	+ .03	− .02	---
+25.01	−38.10	+41.43	−24.72	+73.78	+25.81	+15.08	+30.89	−12.56	−38.83	−19.60	−14.26	+ .02	− .07	---
+ 6.99	−36.12	+11.90	−46.72	−62.62	−35.38	−19.50	+34.51	−19.60	+43.61	+ 2.63	+ 7.31	− .05	+ .02	---
+ 7.65	−29.66	+24.58	+18.07	+76.33	+35.36	−20.78	+33.61	−24.54	+42.95	− 8.78	+ 2.13	+ .02	+ .05	---
+27.60	−58.94	+11.35	−76.06	−20.36	−23.54	+17.68	+22.27	−29.69	−28.09	+33.90	+11.26	+ .07	− .04	---
+29.66	−61.40	+13.60	−77.60	−13.30	−20.91	+14.80	+18.16	−27.69	−20.02	+39.21	+14.85	+ .05	− .06	---
+ 0.02	−32.32	+17.04	+33.94	+71.88	+36.54	−12.30	+28.64	− 8.90	+36.10	+25.88	+17.16	− .06	− .13	---
−33.18	−66.01	+17.34	+80.42	+ 0.95	+15.90	−19.75	+28.67	−28.32	+33.46	−30.02	− 7.94	+ .06	+ .14	---
+29.16	−45.65	+42.74	−37.26	+71.56	+22.54	+ 9.41	+16.66	−21.04	− 4.54	+44.85	+19.14	+ .34	+ .17	---
−35.05	−58.68	+40.08	+59.82	−55.12	−11.71	+21.07	+34.54	−24.43	−38.60	+24.06	+ 3.82	+ .18	− .03	---
+36.64	−68.60	+26.14	−78.08	+23.96	− 4.15	+11.65	+29.14	− 3.90	−37.81	−25.64	−17.94	+ .12	+ .12	---
−30.07	−63.18	+ 8.92	+79.94	+16.92	+21.33	+12.07	+29.67	− 3.65	−38.50	−24.60	−17.65	+ .03	− .03	---
+35.68	−68.95	+20.28	−80.56	+13.44	− 8.56	−18.80	+30.85	−23.72	+28.20	−35.92	−10.01	− .34	− .18	---
+17.74	−35.64	+31.94	− 8.57	+81.25	+32.11	+19.06	+31.54	−23.43	−29.16	+35.12	+ 9.45	+ .24	+ .02	---
− 0.80	−34.00	+12.45	+32.18	+74.48	+36.18	−19.93	+39.64	− 7.83	+45.01	− 5.48	+ 6.69	− .03	− .01	---
−21.90	−52.26	+ 1.33	+69.54	+41.15	+28.52	+18.25	+31.98	−20.31	−25.72	+37.10	+10.18	+ .13	− .07	---
+21.47	−39.68	+32.74	−21.55	+77.16	+28.34	−14.02	+31.87	+ 1.21	+42.04	+15.41	+15.18	− .02	− .05	---
+27.49	−59.10	+ 2.76	−75.74	−23.32	−21.82	−19.58	+36.50	−15.34	+31.39	−31.29	− 5.86	− .12	+ .05	---
−14.63	−34.14	+25.33	+ 5.57	−76.92	−30.83	−15.73	+30.00	−15.44	+15.61	−40.22	−12.19	− .18	− .07	---
−18.80	−37.08	+28.58	+16.48	−74.04	−27.89	− 9.86	+25.58	+ 4.68	+37.74	+19.35	+16.96	+ .03	.00	---
− 0.22	−17.24	+31.52	−60.54	−41.28	−35.92	−14.16	+17.82	−25.89	+40.78	+ 4.13	+13.65	+0.01	+ .04	+0.04
+ 0.82	−18.14	+31.04	−61.72	−39.52	−35.91	−15.07	+18.06	−27.23	+40.96	+ 1.30	+12.64	+ .29	+ .31	+ .32
−31.45	−46.03	+47.32	+69.45	−31.39	+20.07	−19.97	+10.12	−38.84	+25.10	−34.45	− 3.97	− .08	− .15	− .14
−31.85	−46.08	+48.08	+68.82	−32.81	+19.43	−19.76	+ 9.14	−38.76	+23.40	−35.63	− 4.94	+ .10	+ .02	+ .03
+19.00	−37.38	+32.94	−76.38	− 3.46	−32.24	−19.48	+ 8.24	−38.58	+21.06	−37.21	− 6.13	+ .30	+ .18	+ .19
−29.82	−46.45	+44.12	+73.24	−25.00	+23.39	− 3.80	+11.50	−18.38	+35.41	+24.84	+20.30	− .05	− .07	− .06
−30.52	−46.74	+45.23	+72.46	−27.19	+22.48	− 5.27	+13.00	−18.47	+37.11	+22.22	+19.98	− .25	− .26	− .26
+15.55	−34.41	+31.40	−76.65	−12.00	−34.68	− 5.33	+13.22	−18.43	+37.40	+21.98	+20.03	− .23	− .26	− .26
+36.80	−28.56	+68.54	−24.22	+73.87	+ 9.81	+ 9.78	+17.77	−20.06	−41.56	−12.76	−18.32	+ .20	+ .02	+ .02
+36.67	−28.06	+68.54	−23.25	+74.20	+10.29	+10.35	+18.30	−20.44	−41.94	−11.45	−18.00	+ .50	+ .32	+ .32
−38.19	−39.66	+65.31	+45.23	−63.53	+ 1.58	+17.55	+22.74	−29.00	−42.56	+ 9.46	−11.23	+ .14	+ .06	+ .06
−38.20	−39.26	+65.57	+44.43	−64.09	+ 1.10	+17.88	+22.70	−29.63	−42.26	+10.74	−10.70	+ .04	− .04	− .04
− 9.62	−12.38	+39.85	−52.58	−57.69	−37.04	−18.67	+22.59	−31.16	+41.32	−14.10	+ 9.30	− .35	− .32	− .32
− 9.08	−12.67	+39.38	−53.42	−56.94	−37.18	−18.98	+22.40	−31.86	+40.82	−15.52	+ 8.65	− .12	− .09	− .09
+34.75	−47.83	+52.98	−66.37	+41.35	−16.18	+20.08	+21.24	−34.57	−38.11	+21.46	− 5.79	− .26	− .44	− .44
+34.97	−47.74	+53.50	−65.80	+42.26	−15.70	+20.26	+20.84	−35.13	−37.38	+22.71	− 5.13	+ .10	− .08	− .08
+20.71	− 9.94	+51.63	+32.21	+71.44	+32.37	−20.93	+16.68	−38.40	+30.10	−31.80	− 0.34	+ .05	− .01	− .01
+19.93	− 9.88	+50.71	+33.90	+70.65	+32.85	−20.87	+15.54	−38.78	+28.24	−33.47	− 1.53	− .17	− .24	− .23
+37.90	−32.14	+69.08	−29.27	+73.11	+ 7.63	−17.86	+ 6.64	−36.83	+ 8.92	−43.13	−11.18	+ .11	− .07	− .07
+37.80	−31.63	+69.14	−28.30	+73.52	+ 8.14	−17.49	+ 6.14	−36.38	+ 7.55	−43.39	−11.74	+ .04	− .14	− .14
−38.14	−44.92	+62.03	+54.54	−57.12	+ 7.02	−13.45	+ 3.35	−31.27	− 5.38	−43.84	−16.29	− .08	− .20	− .19
−38.24	−44.57	+62.48	+53.69	−57.92	+ 6.45	−12.87	+ 3.19	−30.55	− 6.92	−43.62	−16.75	+ .28	+ .16	+ .17
+34.10	−49.40	+50.62	−69.90	+37.14	−18.69	− 4.68	+ 5.60	−21.98	−24.82	−36.67	−20.67	+ .41	+ .20	+ .20
+34.40	−49.38	+51.22	−69.31	+38.23	−18.15	− 3.90	+ 6.12	−21.38	−26.18	−35.72	−20.83	+ .22	+ .01	+ .01
−33.52	−20.38	+66.95	+ 3.45	−79.38	−20.07	− 7.42	+16.92	−18.21	+41.10	+16.86	+19.94	+ .14	+ .17	+ .17
−32.98	−19.51	+66.42	+ 1.36	−79.45	−20.95	− 8.66	+18.20	−18.62	+42.08	+14.24	+19.43	+ .15	+ .19	+ .19
+15.63	−35.79	+31.34	−78.34	−13.68	−35.87	+13.14	+22.54	−21.54	−44.35	− 3.51	−16.78	+ .08	− .03	− .03
+16.14	−36.34	+31.50	−78.52	−12.54	−35.63	+13.71	+23.00	−22.12	−44.44	− 1.97	−16.32	+ .11	.00	− .01
+34.51	−50.79	+50.45	−70.91	+36.96	−19.00	−21.44	+20.59	−37.63	+30.40	−32.80	+ 0.34	+ .16	+ .03	+ .03
+34.72	−50.78	+50.89	−70.50	+37.75	−18.61	−21.45	+20.08	−37.90	+29.52	−33.60	− 0.23	+ .46	+ .33	+ .33
+39.93	−40.76	+68.86	−37.45	+71.83	+ 5.18	− 7.35	+ 8.14	−23.98	−23.48	−38.74	−20.63	+ .04	− .17	− .17
+39.86	−40.25	+69.05	−36.47	+72.35	+ 5.74	− 6.66	+ 8.38	−23.30	−24.75	−37.94	−20.86	+ .44	+ .23	+ .24
−21.69	−44.84	+32.11	+80.95	+ 4.01	+34.06	+13.06	+26.07	−17.72	−45.27	− 1.59	−17.65	.00	− .08	− .07
−22.20	−45.37	+32.42	+80.98	+ 2.78	+33.72	+13.70	+26.70	−18.22	−45.30	+ 0.06	−17.16	+ .15	+ .08	+ .08
−38.77	−54.06	+56.75	+63.75	−49.85	+11.36	−21.85	+25.00	−35.91	+24.04	−38.32	− 2.25	+ .14	+ .10	+ .10
−38.94	−53.84	+57.29	+63.02	−50.78	+10.79	−21.76	+24.31	−36.22	+22.69	−39.14	− 3.01	− .14	− .19	− .18
−26.37	−18.48	+58.07	−18.01	−78.45	−30.53	− 2.17	+12.77	−18.23	−33.19	−30.43	−21.83	+ .07	+ .01	+ .01
−25.77	−18.12	+57.37	−19.54	−78.09	−31.04	− 1.14	+13.44	−17.45	−34.58	−28.85	−21.91	+ .04	− .02	− .02
−18.64	−42.71	+29.06	+79.39	+12.43	+35.75	−16.34	+30.72	−18.37	+43.97	− 9.17	+14.58	+ .08	+ .10	+ .10
−19.26	−43.38	+29.28	+79.62	+11.04	+35.42	−16.94	+31.22	−19.12	+43.54	−10.99	+13.89	+ .08	+ .10	+ .10
+18.62	−42.96	+28.40	−78.81	−12.67	−35.56	+21.49	+32.20	−28.72	−31.94	+31.20	− 3.80	+ .15	+ .06	+ .06
+19.27	−43.64	+28.63	−79.03	−11.25	−35.21	+21.63	+31.74	−29.54	−30.56	+32.54	− 2.87	+ .05	− .04	− .04
+14.79	−17.50	+44.12	+41.13	+67.82	+37.13	+ 2.48	+13.78	−17.30	+33.24	+29.32	+21.56	+ .26	+ .22	+ .22
+14.07	−17.64	+43.36	+42.44	+67.02	+37.41	+ 1.48	+14.36	−16.48	+34.56	+27.74	+21.65	+ .02	− .02	− .01
+36.82	−57.16	+48.69	−67.23	+40.43	−14.62	−18.72	+33.92	−19.06	+39.18	−19.72	+10.61	+ .10	+ .01	+ .01
+37.00	−57.10	+49.16	−66.74	+41.24	−14.18	−19.01	+34.08	−19.66	+38.60	−20.84	+10.07	+ .13	+ .05	+ .04
−30.15	−54.72	+35.49	+75.15	−17.37	+24.84	− 3.95	+19.21	−11.26	+40.18	+15.60	+20.82	+ .39	+ .37	+ .37
−30.55	−55.02	+36.04	+74.85	−18.58	+24.35	− 4.75	+19.95	−10.91	+40.76	+14.03	+20.65	− .08	− .09	− .09

Observation Equations in x

RHEA$_5$—TETHYS$_3$—Continued

Date	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$\left(\frac{da}{a}\right)_5$	$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$\left(\frac{da}{a}\right)_3$	$\frac{C-O}{n}$	v_{11}	v_{12}
1915									″	″	″
Feb. 20	+71.74	−134.71	− 66.94	+45.17	−34.84	+28.08	+71.43	+32.15	−0.04	+0.01	−0.02
20	+70.74	−133.95	− 65.27	+46.71	−36.46	+29.87	+73.10	+30.30	− .04	+ .03	.00
21	−29.53	− 53.25	− 83.37	+79.35	+38.53	+32.38	+75.14	−27.50	− .13	− .14	− .10
21	−30.89	− 53.28	− 84.82	+78.83	+39.63	+34.07	+76.10	−25.89	− .06	− .07	− .03
27	−60.13	−122.94	− 52.44	−58.33	+44.53	+65.78	+61.78	+14.52	− .04	− .13	− .17
27	−59.26	−122.01	− 51.60	−59.22	+43.98	+66.18	+60.16	+16.10	+ .31	+ .22	+ .18
Mar. 1	+76.74	−135.45	− 79.26	+32.73	+36.53	+63.94	+45.74	+29.04	+ .59	+ .37	+ .34
1	+75.70	−135.14	− 76.74	+35.05	+34.32	+62.30	+42.76	+31.62	+ .42	+ .20	+ .18
12	−80.87	−113.20	−116.19	+12.20	+33.26	+22.22	+70.11	−31.37	− .18	− .22	− .20
12	−81.06	−114.34	−115.48	+10.87	+34.46	+23.40	+71.46	−30.04	+ .12	+ .08	+ .10
31	−27.25	− 83.44	− 38.77	−74.13	+43.67	+41.94	+76.89	− 6.52	+ .27	+ .14	+ .13
31	−25.84	− 81.97	− 39.02	−74.63	+43.92	+43.84	+76.27	− 4.53	+ .13	+ .01	− .01
Apr. 1	+66.80	− 78.91	−115.64	−41.82	−44.06	+46.68	+74.73	+ 1.08	− .08	+ .17	+ .15
1	+67.50	− 80.21	−115.94	−40.68	−44.06	+48.20	+73.77	− 0.70	− .34	− .09	− .11
6	+76.93	−125.24	− 90.38	+13.60	+21.00	+44.17	+35.81	+38.32	+ .20	+ .02	− .02
6	+76.51	−126.02	− 88.22	+15.85	+18.28	+41.32	+34.70	+39.69	.00	− .18	− .22
7	+ 9.42	− 66.10	− 44.59	+77.46	−24.30	+47.37	+37.81	−36.23	− .26	− .08	− .03
7	+ 8.43	− 65.29	− 45.18	+77.57	−23.17	+46.26	+37.06	−36.96	− .13	+ .05	+ .09

DIONE$_4$—TETHYS$_3$

Date	$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$\left(\frac{da}{a}\right)_4$	$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$\left(\frac{da}{a}\right)_3$	$\frac{C-O}{n}$	v_{11}	v_{12}
1909									″	″	″
Sept. 2	+ 3.30	+ 8.22	− 60.27	+60.47	+ 4.38	− 8.51	+47.12	−47.08	−0.34	−0.36	−0.27
2	− 1.21	+ 12.62	− 59.26	+60.55	+ 9.43	−13.51	+48.17	−46.34	+ .18	+ .09	+ .18
Oct. 16	− 1.85	+ 20.38	− 58.94	+62.26	+48.15	−33.94	+90.38	− 6.93	+ .44	+ .02	− .02
22	−60.38	+ 51.84	−110.10	+15.00	+21.87	+ 0.36	+61.59	+43.37	+ .12	− .03	− .03
26	+59.55	+ 54.66	−107.25	−17.52	−26.02	−41.32	+51.70	+40.90	− .04	+ .07	+ .01
26	+60.50	+ 52.14	−110.08	−13.85	−29.53	−44.03	+55.02	+38.44	− .14	− .05	− .09
28	−39.70	+ 0.06	− 92.62	−47.68	−24.16	−40.16	+49.86	+41.97	+ .61	+ .16	+ .14
28	−37.11	− 0.26	− 89.34	−49.72	−27.33	−42.82	+52.45	+39.98	+ .24	− .16	− .21
29	+61.60	+ 34.60	−118.43	+ 6.81	+35.53	−48.20	+61.72	−32.88	+ .40	+ .06	+ .06
29	+61.24	+ 31.86	−118.63	+ 9.53	+37.57	−48.84	+64.75	−30.54	+ .37	− .02	− .02
Nov. 4	− 2.89	+ 24.22	− 57.00	+61.66	+33.43	− 3.97	+75.24	+34.73	+ .34	+ .15	+ .13
4	− 8.60	+ 29.88	− 56.04	+61.13	+28.46	− 2.66	+68.90	+38.90	+ .06	− .11	− .10
Dec. 5	−59.25	+ 44.69	−109.86	− 4.72	−43.53	−55.69	+68.82	+16.02	+ .31	+ .13	+ .15
5	−59.09	+ 42.97	−110.28	− 6.49	−44.19	−54.92	+70.66	+14.12	+ .09	− .06	− .06
20	+57.86	+ 48.42	−105.14	+ 2.32	−37.94	−58.72	+54.00	+24.62	− .08	− .15	− .10
20	+57.78	+ 47.02	−105.64	+ 3.82	−38.83	−58.90	+55.70	+23.18	+ .20	+ .14	+ .18
1910											
Sept. 7	−47.23	+ 24.43	− 98.80	+37.88	− 8.40	+16.40	+46.65	−46.51	+ .34	+ .01	----
9	+35.76	− 32.77	− 80.30	+49.05	+20.03	− 8.92	+58.08	−42.97	+ .34	+ .23	----
15	−25.24	+ 20.49	− 72.40	+55.79	+46.47	+ 1.85	+93.61	−11.27	+ .51	+ .09	----
17	+60.09	− 15.84	−119.78	+12.45	+47.94	+11.83	+95.14	− 0.47	+ .06	− .21	----
29	−60.08	+ 15.63	−120.24	+16.28	−41.58	−15.15	+85.52	+25.13	+ .23	+ .02	----
Oct. 1	+33.48	− 27.89	− 80.44	+52.58	−44.15	−12.68	+89.74	+20.48	− .22	− .05	----
5	−50.46	− 28.30	−103.68	−37.00	−48.45	+10.58	+96.50	− 6.00	+ .23	− .10	----
11	+24.08	+ 24.48	− 71.30	−57.99	− 7.39	+ 8.28	+50.00	−48.47	+ .28	+ .01	----
12	+30.42	− 23.96	− 78.40	+54.97	+ 2.07	+ 2.79	+49.12	+49.01	− .11	.00	----
Nov. 18	−38.23	− 18.17	− 89.20	−49.42	+ 8.11	−15.98	+48.18	−48.10	+ .31	− .13	----
Dec. 25	+31.82	− 9.48	− 80.51	+50.23	−31.43	−43.18	+57.04	+34.18	− .23	+ .02	----
1911											
Jan. 4	+22.98	+ 36.36	− 60.63	−53.72	−22.95	− 1.23	+60.50	−39.43	+ .34	+ .14	----
6	−54.98	+ 8.49	−111.30	−19.22	− 3.48	−12.90	+44.01	−45.33	+ .49	+ .07	----
1911											
Sept. 12	−56.06	− 53.89	−100.78	−22.24	−13.50	+33.51	+40.48	−45.09	+ .15	− .25	----
12	−54.95	− 55.12	− 98.27	−24.81	−10.44	+30.36	+40.26	−45.90	+ .43	+ .03	----
13	+54.71	− 11.22	−111.80	−25.51	+ 2.74	+22.58	+41.66	+47.07	+ .13	+ .03	----
13	+55.63	− 13.16	−112.94	−23.46	+ 0.19	+20.21	+42.60	+47.15	+ .14	+ .05	----
16	+58.01	− 50.73	−105.84	+17.79	+30.16	+ 6.42	+70.24	−36.56	+ .31	+ .14	----
16	+57.29	− 52.09	−104.00	+19.97	+32.12	+ 7.16	+72.73	−34.84	+ .22	+ .05	----
20	−59.98	− 23.87	−118.13	+11.57	+42.04	+15.72	+85.60	−22.52	+ .52	+ .01	----
20	−60.42	− 26.56	−118.22	+ 8.90	+43.39	+18.38	+87.08	−19.78	+ .53	+ .01	----
Oct. 11	+34.89	− 48.00	− 72.70	+52.17	+45.09	+45.31	+80.31	+19.24	+ .08	− .09	----
11	+33.14	− 46.72	− 71.08	+53.29	+44.12	+46.21	+78.14	+21.38	+ .13	− .04	----
12	−62.70	− 25.88	−122.78	+ 4.29	−46.94	+42.16	+85.06	−14.23	+ .58	+ .19	----
12	−62.82	− 28.18	−122.46	+ 1.96	−46.12	+43.68	+82.92	−16.72	+ .58	+ .19	----
Nov. 1	+30.16	+ 11.73	− 81.51	−56.07	+19.60	+30.12	+52.13	+45.69	+ .27	+ .10	----
1	+32.00	+ 12.49	− 83.49	−55.03	+17.37	+28.06	+50.89	+46.58	+ .08	− .09	----
15	+44.03	+ 17.90	− 97.74	−46.01	−49.70	+13.61	+98.49	+ 1.47	− .08	− .16	----
15	+45.43	+ 17.64	− 99.69	−44.64	−49.73	+15.81	+98.19	− 0.75	+ .04	− .05	----
22	−63.48	− 12.32	−126.40	+ 3.40	−13.23	− 6.46	+54.26	+47.81	+ .26	− .08	----
22	−63.54	− 14.14	−126.32	+ 1.58	−15.20	− 8.04	+55.58	+47.22	+ .26	− .08	----
30	−37.91	+ 21.46	− 88.60	+50.60	−45.86	− 9.58	+93.04	+18.20	+ .19	+ .03	----
30	−39.51	+ 21.76	− 90.60	+49.36	−46.67	− 7.74	+94.38	+16.06	+ .13	− .04	----

Observation Equations in y

RHEA₅—TETHYS₃—Continued

$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_5$	$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$d(\gamma \sin \theta)_3$	$d(\gamma \cos \theta)_3$	$\left(\frac{da}{a}\right)_3$	$\frac{C-O}{n}$	v_{11}	v_{12}
												″	″	″
+20.07	−44.76	+26.06	−75.21	− 7.78	−32.72	+13.76	+17.19	−26.56	+13.55	+40.06	+15.63	+0.09	0.00	0.00
+20.78	−45.52	+26.40	−75.37	− 6.14	−32.28	+12.93	+16.48	−25.76	+15.62	+39.29	+16.32	+ .31	+ .22	+ .22
+36.09	−37.71	+62.89	−22.91	+71.94	+12.97	−11.68	+15.66	−24.42	−18.55	−37.92	−17.20	− .06	− .22	− .22
+35.86	−37.04	+62.89	−21.66	+72.35	+13.59	−10.96	+15.26	−23.66	−20.10	−37.13	−17.67	+ .24	+ .08	+ .08
−26.12	−50.85	+30.04	+74.25	− 8.08	+27.55	+ 6.82	+22.15	− 8.49	−41.23	− 6.68	−19.41	+ .11	+ .05	+ .05
−26.54	−51.24	+30.46	+74.13	− 9.18	+27.16	+ 7.51	+22.87	− 8.33	−41.44	− 5.20	−19.16	+ .18	+ .12	+ .13
+14.44	−38.40	+24.12	−71.93	−18.95	−34.95	+13.11	+29.24	− 8.99	−40.76	+ 8.40	−15.76	+ .04	− .02	− .02
+15.50	−39.54	+24.22	−72.47	−16.74	−34.49	+14.22	+30.54	− 9.74	−40.03	+11.34	−14.76	+ .10	+ .04	+ .04
+ 5.95	−20.44	+32.64	+50.72	+52.37	+36.63	−13.47	+18.35	−24.72	−15.40	−37.74	−14.90	+ .06	.00	+ .01
+ 5.35	−20.76	+32.12	+51.58	+51.53	+36.72	−12.87	+17.77	−24.18	−16.88	−37.10	−15.42	+ .23	+ .17	+ .18
−33.50	−52.60	+43.40	+58.39	−39.32	+12.74	− 2.50	+15.43	−12.46	−34.68	−18.62	−19.20	+ .35	+ .29	+ .29
−33.73	−52.49	+44.07	+57.65	−40.42	+12.11	− 1.63	+15.72	−11.64	−35.50	−17.02	−19.30	− .05	− .11	− .11
−19.32	−17.54	+45.73	−26.53	−65.06	−30.10	+ 0.12	+16.39	−10.24	+36.70	+14.00	+19.32	+ .02	+ .02	+ .02
−18.80	−17.38	+45.14	−27.63	−64.60	−30.42	− 0.66	+16.82	− 9.58	+37.24	+12.50	+19.31	− .10	− .09	− .10
+ 5.78	−27.81	+24.14	−63.01	−29.70	−34.97	+16.94	+33.32	−10.86	−28.42	+26.66	− 8.91	.00	− .01	− .01
+ 6.80	−28.79	+23.79	−63.86	−27.84	−34.78	+17.52	+33.78	−12.12	−26.48	+28.58	− 7.70	+ .22	+ .20	+ .21
+35.10	−48.75	+50.71	−46.65	+51.63	− 4.67	−16.05	+32.43	− 9.30	+30.52	−24.11	+10.37	+ .17	+ .09	+ .08
+35.14	−48.47	+51.07	−45.98	+52.23	− 4.22	−16.36	+32.74	− 9.80	+29.76	−25.04	+ 9.87	− .05	− .13	− .14

DIONE₄—TETHYS₃

$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$d(\gamma \sin \theta)_4$	$d(\gamma \cos \theta)_4$	$\left(\frac{da}{a}\right)_4$	$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$d(\gamma \sin \theta)_3$	$d\gamma (\cos \theta)_3$	$\left(\frac{da}{a}\right)_3$	$\frac{C-O}{n}$	v_{11}	v_{12}
												″	″	″
+13.49	−26.34	− 5.87	−54.45	−22.81	− 0.67	−11.12	+22.26	+ 1.48	+43.27	+15.88	− 1.59	−0.13	+0.05	+0.04
+13.50	−26.56	− 4.89	−56.00	−18.69	+ 0.34	−10.89	+21.95	+ 0.31	+44.74	+11.12	− 2.78	− .15	+ .03	+ .02
+12.50	−23.96	− 7.18	−58.34	−17.83	+ 0.44	− 0.85	+10.15	+ 2.80	+22.18	−42.16	−10.40	− .01	− .06	− .02
+ 2.90	−13.20	− 1.48	−32.83	+51.38	+11.95	+ 9.42	+16.19	+10.46	−33.33	−33.99	− 4.03	+ .03	+ .20	+ .15
− 3.36	−13.40	− 1.27	+34.88	−49.88	−11.66	+ 8.17	+17.27	+ 2.08	−46.09	+11.63	+ 5.97	+ .11	+ .02	+ .01
− 2.64	−12.85	− 1.77	+31.77	−51.92	−11.84	+ 7.61	+16.54	+ 1.56	−44.87	+15.67	+ 6.67	− .03	− .13	− .13
− 9.32	−16.16	−12.04	+31.95	+51.80	+ 7.67	+ 8.37	+17.47	+ 2.53	−46.48	+ 9.78	+ 5.58	+ .02	+ .02	+ .03
− 9.71	−16.80	−12.10	+34.66	+50.02	+ 7.16	+ 7.92	+16.89	+ 2.02	−45.59	+13.34	+ 6.20	+ .05	+ .04	+ .05
+ 1.39	−11.00	− 5.42	+12.86	−59.42	−11.94	− 6.32	+14.80	+ 1.16	+41.42	−23.24	− 7.79	− .08	− .02	− .04
+ 1.92	−10.96	− 5.95	+10.22	−59.92	−11.87	− 5.81	+14.16	+ 1.07	+39.84	−25.84	− 8.18	+ .07	+ .11	+ .10
+11.78	−22.26	− 7.74	−58.32	−16.43	+ 0.62	+ 7.53	+11.99	+11.10	−22.92	−41.39	− 6.33	+ .04	− .01	− .01
+11.67	−22.43	− 6.66	−59.60	−10.94	+ 1.71	+ 8.31	+13.30	+11.28	−28.28	−37.93	− 5.26	− .04	− .07	− .07
− 0.92	− 9.50	− 5.40	−12.84	+57.03	+10.77	+ 2.46	+ 9.36	+ 3.37	−24.60	+38.42	+ 8.65	− .13	− .02	− .03
− 1.24	− 9.43	− 5.71	−11.12	+57.38	+10.74	+ 2.08	+ 9.01	+ 3.55	−22.92	+39.45	+ 8.75	− .15	− .04	− .05
+ 0.48	− 9.24	− 5.09	+13.64	−55.30	−10.51	+ 4.16	+10.76	+ 3.51	−30.12	+32.72	+ 7.67	+ .14	+ .05	+ .05
+ 0.75	− 9.15	− 5.34	+12.20	−55.63	−10.49	+ 3.87	+10.43	+ 3.50	−28.88	+33.83	+ 7.82	+ .23	+ .14	+ .14
+11.63	−25.40	+10.38	−41.32	+40.12	+14.55	−13.98	+27.98	− 1.60	+41.04	+18.36	+ 1.84	+ .08	− .02	----
+15.09	−31.23	− 7.44	−42.16	−39.46	−10.96	−12.50	+24.36	− 8.64	+44.20	− 8.96	− 6.57	− .04	− .13	----
+17.03	−33.96	+ 8.18	−55.56	+17.63	+ 7.74	− 2.68	+14.36	− 3.93	+20.12	−40.83	−13.89	+ .44	+ .16	----
+ 3.83	−19.59	− 3.18	− 5.13	−58.20	−18.31	+ 0.53	+14.16	− 0.62	+10.16	−44.50	−14.14	+ .11	− .04	----
+ 4.86	−19.97	+ 4.67	−21.72	+55.24	+18.06	+ 6.72	+17.14	− 6.39	−30.82	+34.57	+12.40	− .35	− .24	----
+15.77	−31.95	− 8.64	−46.34	−37.22	−10.01	+ 5.32	+16.00	− 5.23	−26.75	+37.92	+13.04	− .14	+ .10	----
−11.06	−25.05	− 9.32	+29.90	+51.68	+15.02	− 2.38	+14.45	+ 2.34	− 2.22	+46.54	+13.84	+ .02	+ .15	----
−17.12	−34.55	+ 5.46	+57.52	−16.96	− 7.14	−13.90	+27.74	+ 2.22	+44.61	+14.24	+ 1.46	− .07	− .04	----
+16.23	−32.44	− 9.00	−49.11	−34.48	− 8.94	+13.95	+27.89	+ 0.84	−45.95	− 9.20	+ 0.07	+ .11	+ .12	----
−13.79	−26.89	−12.28	+43.49	+41.30	+10.63	−12.73	+25.47	+ 2.64	+46.63	− 4.23	− 2.76	+ .23	+ .06	----
+13.64	−25.36	−13.20	−45.91	−34.14	− 8.60	+ 8.47	+18.92	+ 0.75	−32.18	+30.98	+ 8.49	− .13	+ .05	----
−14.58	−29.80	− 1.32	+52.93	−18.92	− 6.27	−10.42	+17.51	+12.58	+39.12	+19.90	+ 5.50	+ .02	+ .07	----
− 5.25	−15.88	− 9.01	+15.40	+53.88	+14.94	−11.74	+21.46	+ 9.58	+43.73	+ 0.57	+ 0.42	+ .26	+ .06	----
− 8.34	−26.88	+ 0.46	+26.13	+49.35	+21.08	−16.22	+31.27	−10.19	+41.44	+13.52	+ 5.33	+ .18	+ .12	----
− 9.31	−27.82	0.00	+28.40	+48.08	+20.67	−16.55	+31.38	−11.33	+42.26	+10.70	+ 4.23	− .05	− .11	----
− 9.61	−22.86	+16.41	+17.89	−52.97	−20.56	+17.04	+31.09	−14.02	−43.53	− 3.46	− 1.45	+ .02	+ .04	----
− 8.84	−22.43	+15.68	+15.91	−53.60	−20.90	+17.09	+30.78	−14.89	−43.66	− 1.10	− 0.53	+ .10	+ .12	----
+ 6.66	−25.50	+ 1.28	−22.47	−51.52	−21.78	−13.54	+21.36	−19.71	+34.20	−27.54	−10.56	.00	+ .03	----
+ 7.48	−26.20	+ 0.77	−24.41	−50.63	−21.52	−12.94	+20.45	−19.46	+32.63	−29.38	−11.29	− .21	− .18	----
+ 4.36	−21.46	+10.98	− 4.13	+56.44	+22.48	− 8.57	+16.30	−15.88	+20.88	−38.94	−14.98	− .02	+ .09	----
+ 3.36	−21.41	+ 9.97	− 1.62	+56.57	+22.65	− 7.59	+15.74	−14.93	+18.34	−40.20	−15.50	− .07	+ .04	----
+19.29	−40.67	− 0.90	−52.25	−25.83	−12.92	+ 6.39	+20.69	− 1.24	−20.11	−40.85	−16.32	− .14	− .07	----
+19.70	−41.27	− 0.42	−53.08	−24.09	−12.28	+ 7.16	+21.46	− 0.89	−22.04	−39.84	−16.00	− .05	+ .02	----
+ 1.60	−22.28	+ 7.16	+ 3.64	+58.26	+23.17	− 4.57	+19.10	− 2.21	+15.64	+42.79	+16.92	+ .14	+ .04	----
+ 0.75	−22.40	+ 6.31	+ 5.79	+58.09	+23.22	− 5.47	+19.85	− 1.65	+17.91	+41.88	+16.65	.00	− .10	----
−20.37	−38.58	+17.08	+48.00	−34.79	−10.93	+15.82	+32.46	− 1.46	−44.15	−13.96	− 7.41	− .07	− .02	----
−20.00	−37.86	+17.35	+46.82	−36.38	−11.61	+16.16	+32.92	− 2.16	−44.77	−11.81	− 6.64	− .09	− .05	----
−16.52	−32.76	+16.34	+37.07	−46.45	−15.78	+ 1.10	+16.82	− 4.29	+ 4.50	+46.18	+17.22	+ .24	+ .13	----
−16.03	−32.06	+16.25	+35.62	−47.57	−16.28	+ 0.33	+16.91	− 3.52	+ 6.55	+45.93	+17.25	− .02	− .13	----
+ 1.23	−22.39	+ 4.05	+ 4.79	+59.17	+22.61	+16.64	+32.32	− 8.87	−42.46	+18.52	+ 3.98	− .05	− .09	----
+ 0.58	−22.42	+ 3.40	+ 6.48	+59.00	+22.64	+16.46	+31.88	− 9.43	−41.66	+20.26	+ 4.67	− .06	− .10	----
+17.93	−35.45	+14.44	−42.08	+41.50	+13.41	+ 6.80	+18.81	− 8.44	−10.07	+45.02	+15.49	+ .16	+ .07	----
+17.49	−34.74	+14.55	−40.74	+42.82	+13.97	+ 6.08	+18.32	− 7.82	− 7.98	+45.44	+15.79	+ .11	+ .02	----

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Observation Equations in x

DIONE$_4$—TETHYS$_3$—Continued

Date	$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$\left(\frac{da}{a}\right)_4$	$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$\left(\frac{da}{a}\right)_3$	$\frac{C-O}{n}$	v_{11}	v_{12}
1912									″	″	″
Oct. 1	+21.12	− 52.96	− 47.92	+57.60	−36.64	+65.82	+44.59	−30.85	+0.05	+0.02	----
2	−60.70	− 71.80	− 98.36	− 9.64	+40.32	+67.99	+50.56	+26.02	+ .46	− .02	----
2	−58.49	− 76.71	− 90.30	−18.86	+33.54	+63.16	+41.09	+34.32	+ .52	+ .05	----
5	−44.69	− 75.22	− 64.40	−42.61	−20.45	+49.44	+33.67	−43.64	+ .51	+ .04	----
7	−34.36	− 17.26	− 84.14	+51.52	− 6.82	+35.21	+35.16	−47.86	+ .06	− .11	----
10	−59.60	− 46.10	−111.33	+17.84	−25.17	+19.33	+62.32	+41.52	+ .26	− .03	----
10	−61.68	− 55.86	−110.27	+ 8.20	−33.97	+23.48	+72.58	+34.69	+ .32	− .04	----
16	−18.92	− 49.66	− 50.42	−59.79	−40.53	+65.90	+54.61	−27.45	+ .36	+ .03	----
26	−18.23	− 17.21	− 68.72	+60.74	+17.12	+16.10	+55.42	−46.46	+ .29	+ .11	----
28	+61.48	− 71.42	−101.34	+15.99	+37.17	+19.92	+78.80	−32.86	.00	− .11	----
Nov. 9	−62.08	− 40.64	−118.42	+15.91	−12.76	+14.53	+52.72	+48.38	+ .25	− .02	----
20	−61.18	− 32.88	−119.51	+19.80	+44.78	+56.85	+72.83	+22.68	+ .43	+ .05	----
22	+29.12	− 55.00	− 60.42	+57.30	+35.39	+54.26	+57.73	+35.60	− .05	− .09	----
29	− 9.40	− 33.78	− 57.01	−63.53	+22.42	+ 4.77	+63.25	−44.86	+ .37	− .01	----
30	+58.24	− 67.28	− 98.84	+27.02	−21.42	+ 4.77	+62.18	+45.32	+ .05	+ .16	----
Dec. 13	+31.94	− 1.61	− 84.40	−55.15	+ 7.39	+23.32	+45.80	+49.22	+ .08	+ .16	----
14	+29.04	− 50.66	− 63.39	+56.68	− 9.10	+24.83	+45.87	−48.89	.00	− .05	----
19	+63.14	− 36.38	−121.06	− 5.63	−28.10	− 2.75	+69.36	+40.75	− .16	+ .02	----
20	−34.84	+ 0.46	− 87.51	+52.91	+32.32	− 2.85	+74.66	−37.44	+ .24	.00	----
1913											
Jan. 15	+34.54	+ 5.74	− 85.34	−50.41	−30.65	+35.35	+62.00	−36.57	− .04	− .01	----
30	−26.40	+ 5.50	− 74.87	+53.37	−40.72	+29.92	+79.00	−22.38	+ .08	− .02	----
Feb. 1	+53.65	− 48.27	− 99.10	+25.25	−24.12	+27.54	+55.95	−39.53	− .17	− .11	----
1914											
Sept. 26	+58.09	−104.32	− 51.29	− 3.50	−43.32	+87.33	+ 8.38	−13.73	− .21	----	−0.04
26	+58.20	−105.35	− 49.50	− 1.44	−42.56	+86.38	+ 6.26	−15.94	− .15	----	+ .02
Oct. 19	−44.83	− 70.96	− 68.44	+40.96	−10.19	+50.20	+ 6.14	−46.30	+ .11	----	− .03
19	−49.08	− 77.44	− 70.14	+35.78	− 2.68	+46.00	+12.42	−47.34	− .14	----	− .33
21	+40.68	− 92.39	− 11.88	+45.36	+16.11	+45.35	+31.41	−44.77	+ .05	----	− .06
21	+39.51	− 90.91	− 11.39	+46.38	+17.76	+46.04	+33.02	−44.15	− .01	----	− .13
28	−27.91	− 77.50	− 11.61	−54.99	−48.04	+89.02	+36.26	+ 3.16	− .06	----	− .08
28	−25.75	− 75.15	− 12.09	−56.04	−48.14	+90.14	+33.80	+ 0.45	+ .12	----	+ .11
30	−51.30	− 79.65	− 73.33	+34.60	−46.09	+91.17	+19.80	−14.42	+ .25	----	+ .21
30	−54.30	− 85.42	− 73.35	+29.69	−43.73	+88.76	+13.78	−20.49	− .18	----	− .24
30	−54.95	− 86.78	− 73.19	+28.47	−43.04	+87.96	+12.46	−21.89	+ .08	----	+ .01
31	+ 3.95	− 53.42	− 32.10	−61.83	+44.72	+89.90	+16.16	+18.46	+ .45	----	+ .18
31	+ 5.29	− 52.99	− 33.38	−61.73	+44.12	+89.23	+14.79	+19.87	+ .34	----	+ .08
Nov. 2	−62.14	−110.93	− 56.10	− 1.74	+30.63	+71.86	+ 2.69	+37.66	+ .42	----	− .05
2	−62.07	−111.65	− 54.40	− 3.60	+28.97	+69.76	+ 2.43	+38.95	+ .44	----	− .03
3	+44.87	− 69.23	− 71.58	−43.14	−19.86	+59.40	+ 4.12	−44.37	− .35	----	− .22
3	+45.94	− 70.65	− 72.20	−42.00	−18.23	+57.76	+ 4.78	−45.06	− .03	----	+ .10
4	+ 8.35	− 59.97	− 22.36	+61.78	+17.61	+57.20	+ 5.31	+45.39	+ .24	----	+ .08
4	+ 7.15	− 59.16	− 23.26	+61.93	+16.32	+55.98	+ 5.94	+45.86	+ .19	----	+ .03
6	+60.06	− 98.15	− 71.39	−17.36	+ 1.71	+45.84	+17.04	+48.79	− .12	----	− .12
6	+60.59	− 99.88	− 70.32	−15.40	− 0.59	+44.92	+19.14	+48.82	− .05	----	− .04
9	+58.34	−113.10	− 36.96	+23.20	+27.90	+50.67	+46.62	−40.34	+ .60	----	+ .46
9	+57.66	−112.58	− 35.25	+24.85	+29.52	+52.18	+47.94	−39.16	− .01	----	− .15
11	+13.87	− 51.34	− 43.66	−61.43	+39.30	+64.36	+53.96	−29.56	− .03	----	− .22
13	−63.16	−110.27	− 61.61	+ 0.25	+44.92	+74.80	+53.78	−20.30	+ .48	----	− .03
13	−63.16	−110.87	− 60.53	− 1.00	+45.48	+76.13	+53.33	−19.01	+ .56	----	+ .05
16	−44.02	− 97.38	− 18.75	−45.63	−45.01	+89.88	+21.14	−20.58	+ .02	----	− .08
16	−42.97	− 96.09	− 18.12	−46.61	−44.30	+89.15	+19.68	−22.05	+ .25	----	+ .16
17	+61.65	− 99.95	− 73.74	−15.01	+46.87	+91.44	+26.16	+16.09	+ .10	----	− .08
17	+62.20	−102.06	− 72.24	−12.48	+45.84	+90.63	+23.36	+18.83	+ .42	----	+ .24
Dec. 14	+31.45	− 50.82	− 67.64	−56.58	−31.60	+45.84	+58.72	+39.44	− .25	----	− .10
14	+32.76	− 51.47	− 69.02	−55.83	−32.94	+47.10	+59.91	+38.34	− .15	----	+ .01
15	+ 9.54	− 59.98	− 29.51	+64.05	+45.91	+66.88	+66.40	−21.21	+ .30	----	+ .05
15	+ 8.50	− 59.17	− 30.18	+64.20	+46.40	+68.05	+66.22	−20.12	+ .18	----	− .08
22	+ 2.46	− 51.37	− 39.70	−64.74	−41.34	+82.76	+28.90	−29.13	− .21	----	− .10
26	+ 9.03	− 58.52	− 31.80	+64.11	− 6.06	+44.94	+25.42	−50.19	+ .14	----	+ .12
26	+ 7.63	− 57.43	− 32.69	+64.29	− 4.48	+43.75	+26.48	−50.35	− .14	----	− .17
1915											
Jan. 13	+20.18	− 42.36	− 59.44	−60.82	− 2.76	+35.89	+35.18	+49.96	− .03	----	− .02
13	+21.66	− 42.33	− 61.01	−60.30	− 4.53	+34.91	+36.68	+49.83	− .08	----	− .06
15	−63.33	−103.27	− 73.89	− 9.06	−16.86	+30.86	+48.92	+47.01	+ .27	----	+ .03
15	−63.10	−103.85	− 72.47	−10.56	−18.46	+30.84	+50.64	+46.40	+ .22	----	− .02
20	−42.20	− 49.28	− 83.45	+47.63	+49.11	+66.56	+72.63	− 7.47	+ .37	----	+ .03
20	−43.17	− 50.18	− 84.39	+46.75	+49.32	+67.83	+71.86	− 6.00	− .05	----	− .40
21	−11.19	− 56.94	− 34.24	−62.56	−49.56	+70.38	+69.82	+ 2.28	− .12	----	− .03
21	− 9.48	− 55.45	− 35.14	−62.84	−49.62	+71.80	+68.48	+ 0.33	+ .08	----	+ .18

Observation Equations in y

DIONE$_4$—TETHYS$_3$—Continued

$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$d(\gamma \sin \theta)_4$	$d(\gamma \cos \theta)_4$	$\left(\frac{da}{a}\right)_4$	$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$d(\gamma \sin \theta)_3$	$d(\gamma \cos \theta)_3$	$\left(\frac{da}{a}\right)_3$	$\frac{C-O}{n}$	v_{11}	v_{12}
												''	''	''
+24.28	−45.77	+18.56	−55.59	+ 1.32	− 8.96	−12.82	+28.34	−10.93	+35.44	+25.07	+16.26	−0.08	−0.06	----
− 4.01	−24.66	+10.61	+28.32	+47.96	+25.62	+10.69	+25.96	− 9.97	−32.12	−29.32	−17.78	+ .15	+ .12	----
− 7.90	−28.05	+ 8.52	+35.36	+43.04	+24.70	+14.36	+30.14	−11.91	−37.84	−21.45	−14.97	− .08	− .16	----
−17.92	−39.52	+ 8.90	+50.86	+23.37	+18.88	−18.57	+34.19	−17.31	+43.05	+ 7.46	+ 9.43	+ .10	+ .01	----
+21.74	−31.61	+33.16	−31.84	+46.26	+14.42	−20.57	+34.19	−23.17	+43.46	− 5.70	+ 3.60	− .34	− .16	----
+ 7.56	−20.67	+20.74	+ 5.15	+56.16	+25.07	+18.26	+23.37	−29.88	−29.86	+32.34	+10.30	+ .08	+ .04	----
+ 3.51	−21.13	+16.63	+13.96	+54.66	+25.95	+15.43	+18.90	−28.23	−21.71	+38.30	+14.19	+ .04	− .02	----
−25.10	−47.38	+18.47	+56.71	− 4.50	+ 8.01	−11.28	+27.45	− 8.60	+34.54	+27.92	+17.84	+ .20	− .06	----
+25.44	−41.33	+30.65	−44.75	+36.24	+ 7.57	−20.19	+29.89	−27.98	+35.19	−27.98	− 6.74	− .17	+ .04	----
+ 6.63	−27.92	+ 7.65	−34.63	−46.12	−25.73	−14.60	+20.21	−26.18	+17.57	−41.49	−15.53	− .18	− .10	----
+ 6.68	−22.60	+18.30	+ 8.12	+57.70	+25.83	+20.85	+33.70	−25.04	−37.39	+25.90	+ 4.83	+ .04	− .01	----
+ 8.26	−23.40	+19.16	+ 4.50	+58.33	+25.32	+ 9.10	+26.24	− 4.15	−33.95	−30.56	−19.36	+ .01	+ .04	----
+23.68	−47.96	+ 9.48	−58.30	− 4.69	−12.11	+14.71	+32.96	− 4.48	−41.92	−18.19	−15.51	+ .02	− .02	----
−26.20	−49.84	+16.63	+56.78	−14.04	+ 3.94	−19.32	+31.99	−23.46	+30.14	−34.32	− 8.96	+ .25	+ .12	----
+11.08	−32.58	+ 2.63	−42.89	−39.73	−24.04	+19.50	+32.52	−23.16	−30.82	+33.68	+ 8.52	+ .35	+ .21	----
−22.66	−38.98	+26.52	+35.46	−46.05	−13.05	+20.70	+40.09	−11.04	−43.79	+11.90	− 3.72	+ .33	+ .07	----
+23.21	−47.94	+ 6.16	−57.86	− 4.86	−11.96	−20.54	+40.06	−10.11	+44.13	−10.43	+ 4.44	− .18	− .07	----
− 2.37	−23.90	+10.92	−17.18	−55.21	−25.84	+17.53	+30.62	−20.52	−23.22	+38.73	+11.37	+ .10	− .12	----
+21.68	−37.68	+25.75	−32.52	+47.78	+14.21	−16.18	+28.42	−20.33	+18.79	−41.02	−13.18	− .16	+ .04	----
−20.58	−37.19	+22.54	+29.78	−47.19	−14.03	−15.05	+32.74	+ 3.23	+42.69	+ 8.70	+13.31	+ .26	− .04	----
+21.81	−40.14	+20.17	−34.40	+42.07	+10.72	− 9.02	+24.70	+ 4.30	+36.75	+21.18	+17.43	+ .08	+ .12	----
+10.26	−29.97	− 2.03	−41.32	−34.93	−21.94	−16.44	+34.32	+ 3.97	+42.26	− 0.21	+10.60	+ .10	+ .11	----
− 1.57	− 9.21	+24.08	−37.96	−35.94	−25.59	− 6.55	+11.94	−19.24	+34.32	+22.11	+18.47	− .66	----	−0.59
− 0.66	−10.01	+23.64	−39.22	−34.57	−25.63	− 7.49	+12.84	−19.68	+35.42	+20.32	+18.11	− .02	----	+ .06
+18.03	− 5.12	+40.78	+ 9.34	+53.76	+19.70	−20.01	+17.23	−36.30	+36.09	−22.62	+ 3.74	+ .22	----	+ .28
+15.75	− 4.38	+37.92	+15.22	+52.41	+21.57	−20.35	+14.50	−38.04	+32.03	−28.10	+ 0.50	− .14	----	− .10
+19.94	−30.36	+31.44	−53.83	+10.01	−17.91	−18.99	+ 6.84	−38.11	+18.30	−38.66	− 7.52	+ .13	----	+ .15
+20.39	−30.58	+32.09	−53.56	+11.38	−17.39	−18.70	+ 6.15	−37.80	+16.86	−39.29	− 8.22	− .05	----	− .03
−24.19	−31.88	+38.41	+49.82	−24.25	+12.30	+ 0.71	+ 7.12	−19.42	+29.14	+31.98	+20.64	+ .36	----	+ .22
−24.65	−31.67	+39.45	+48.84	−26.17	+11.35	− 0.46	+ 8.20	−18.98	+30.89	+30.28	+20.65	+ .10	----	− .04
+15.25	− 5.13	+37.58	+18.08	+52.56	+22.56	− 6.80	+14.74	−18.75	+38.94	+19.14	+19.58	+ .05	----	+ .15
+13.08	− 5.13	+35.06	+22.88	+50.68	+23.88	− 9.38	+17.30	−19.86	+41.16	+13.73	+18.48	+ .06	----	+ .15
+12.55	− 5.21	+34.46	+24.01	+50.16	+24.17	− 9.97	+17.86	−20.22	+41.58	+12.40	+18.17	− .11	----	− .02
−27.21	−23.48	+49.14	+30.59	−46.50	− 1.72	+ 8.52	+16.54	−19.37	−40.60	−15.56	−18.94	+ .22	----	− .08
−27.17	−22.91	+49.33	+29.56	−47.17	− 2.31	+ 9.11	+17.13	−19.67	−41.07	−14.26	−18.66	+ .34	----	+ .04
− 0.75	−13.34	+23.94	+45.59	+32.25	+27.36	+16.56	+22.64	−27.29	−43.20	+ 5.92	−12.64	+ .08	----	− .06
− 1.56	−14.10	+23.62	+46.54	+30.87	+27.33	+17.10	+22.73	−28.19	−42.89	+ 7.79	−11.91	+ .18	----	+ .03
−19.01	− 6.76	+42.30	− 9.04	−55.17	−19.75	−19.30	+22.14	−32.60	+40.20	−17.05	+ 7.93	− .05	----	− .13
−18.51	− 6.47	+41.68	−10.42	−54.93	−20.22	−19.58	+21.82	−33.29	+39.55	−18.50	+ 7.22	+ .12	----	+ .04
+27.21	−28.65	+46.41	−39.24	+39.95	− 3.70	+19.70	+21.86	−33.52	−39.29	+19.20	− 6.96	− .04	----	− .03
+27.27	−28.26	+46.77	−38.46	+40.70	− 3.17	+19.90	+21.58	−34.04	−38.74	+20.30	− 6.40	− .12	----	− .11
− 7.67	− 7.47	+29.64	−33.93	−44.75	−26.45	+20.96	+17.24	−38.22	−30.72	+31.30	− 0.09	+ .16	----	+ .10
− 6.80	− 7.94	+28.88	−35.37	−43.62	−26.69	+20.94	+16.33	−38.58	−29.20	+32.72	+ 0.90	+ .04	----	− .01
+10.21	−23.34	+23.10	−54.49	−14.51	−25.73	−16.95	+ 5.48	−35.72	+ 5.62	−43.68	−12.50	+ .15	----	+ .13
+10.93	−24.09	+23.33	−54.88	−12.96	−25.43	−16.42	+ 4.93	−35.06	+ 3.82	−43.88	−13.19	+ .11	----	+ .08
−27.09	−20.87	+50.36	+22.84	−51.74	− 6.09	−12.18	+ 3.08	−29.70	− 8.69	−43.30	−17.26	+ .17	----	− .10
+ 0.13	−13.41	+24.42	+45.46	+33.88	+27.86	− 8.14	+ 3.84	−25.15	−18.19	−40.36	−19.56	+ .24	----	+ .09
− 0.42	−13.89	+24.16	+46.13	+32.98	+27.86	− 7.58	+ 4.06	−24.58	−19.33	−39.82	−19.79	+ .17	----	+ .02
−20.13	−33.08	+30.10	+56.11	− 9.52	+19.45	− 9.43	+18.98	−18.96	+42.62	+12.56	+19.07	+ .13	----	+ .01
−20.57	−33.37	+30.66	+55.90	−10.79	+18.99	−10.05	+19.60	−19.29	+43.01	+11.15	+18.75	+ .22	----	+ .09
− 6.65	− 9.01	+28.92	−36.56	−43.67	−27.22	+ 7.52	+17.11	−18.18	−41.27	−16.62	−19.94	+ .10	----	− .03
− 5.54	− 9.67	+28.00	−38.31	−42.14	−27.46	+ 8.69	+18.32	−18.58	−42.18	−14.14	−19.46	+ .08	----	− .04
−25.20	−18.37	+48.98	+ 7.25	−57.53	−13.98	+16.68	+10.58	−34.66	+ 0.81	+45.27	+14.16	+ .01	----	− .12
−24.86	−17.76	+48.69	+ 5.90	−57.68	−14.57	+16.19	+10.09	−34.10	+ 2.36	+45.22	+14.72	+ .31	----	+ .18
+28.52	−35.61	+44.78	−40.82	+41.21	− 4.27	− 8.62	+ 7.85	−25.32	−21.02	−40.14	−20.14	− .15	----	− .18
+28.59	−35.32	+45.14	−40.15	+41.87	− 3.81	− 8.14	+ 7.94	−24.82	−21.96	−39.62	−20.33	+ .04	----	+ .01
−28.91	−32.68	+47.68	+32.55	−48.01	− 1.08	−13.14	+26.22	−17.66	+45.26	+ 1.30	+17.58	− .14	----	− .31
+28.65	−37.09	+43.88	−40.51	+41.44	− 4.06	−21.88	+28.38	−33.34	+31.01	−32.94	+ 2.03	− .08	----	− .02
+28.74	−36.70	+44.36	−39.59	+42.31	− 3.44	−21.93	+27.91	−33.84	+29.96	−33.90	+ 1.34	− .16	----	− .11
−27.35	−28.01	+47.84	+17.69	−54.46	− 9.05	+21.77	+28.28	−33.14	−23.16	+38.24	+ 1.78	+ .26	----	+ .05
−27.11	−27.30	+47.85	+16.35	−54.88	− 9.72	+21.69	+27.62	−33.55	−21.78	+39.04	+ 2.55	+ .50	----	+ .29
− 4.05	−21.80	+20.06	+50.40	+27.01	+28.49	+20.34	+22.62	−34.70	−11.10	+43.22	+ 7.90	− .27	----	− .35
− 4.73	−22.43	+19.80	+51.01	+25.80	+28.39	+20.04	+21.87	−34.68	− 9.60	+43.58	+ 8.59	+ .05	----	− .03
+21.47	−18.15	+43.30	+ 5.23	+56.61	+18.99	− 2.71	+13.61	−17.58	−32.92	−29.77	−21.56	− .10	----	− .16
+21.08	−17.72	+42.90	+ 6.39	+56.48	+19.43	− 2.06	+13.96	−17.03	−33.79	−28.78	−21.63	− .15	----	− .21
−28.18	−40.42	+39.62	+41.11	−39.16	+ 5.06	+ 0.44	+15.02	−15.68	+35.86	+26.05	+21.69	+ .48	----	+ .31
−28.31	−40.02	+40.29	+40.03	−40.27	+ 4.29	− 0.42	+15.63	−15.07	+36.86	+24.61	+21.70	+ .08	----	− .09

Observation Equations in x

DIONE$_4$—TETHYS$_3$—Continued

Date	$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$\left(\frac{da}{a}\right)_4$	$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$\left(\frac{da}{a}\right)_3$	$\frac{C-O}{n}$	v_{11}	v_{12}
1915									″	″	″
Jan. 29	−49.57	− 96.44	− 45.06	−38.78	−22.84	+56.32	+28.44	−43.49	+0.04	----	−0.13
29	−48.81	− 95.74	− 44.07	−39.72	−21.62	+54.96	+28.22	−44.11	+ .22	----	+ .05
Feb. 9	−40.90	− 85.87	− 38.38	−46.46	−48.10	+67.39	+68.82	− 4.33	+ .05	----	+ .01
9	−39.68	− 84.55	− 37.49	−47.51	−47.92	+68.45	+67.34	− 6.14	+ .15	----	+ .11
19	− 8.34	− 38.68	− 49.15	+60.28	+10.81	+23.76	+45.20	−46.27	+ .17	----	+ .08
19	− 9.79	− 38.01	− 50.45	+60.06	+12.42	+23.14	+46.74	−45.86	+ .14	----	+ .05
20	−28.77	− 70.93	− 33.82	−53.49	−31.54	+25.21	+67.80	+35.40	− .05	----	− .11
20	−27.39	− 69.38	− 33.56	−54.21	−32.82	+26.21	+69.24	+34.21	− .05	----	− .10
21	+59.37	− 93.25	− 74.53	+12.24	+36.30	+29.44	+73.00	−30.40	+ .14	----	+ .04
21	+59.03	− 93.77	− 73.05	+13.77	+37.41	+30.83	+74.10	−29.01	− .02	----	− .13
27	+16.70	− 57.09	− 34.29	+57.60	+45.44	+64.66	+64.85	+11.37	+ .31	----	+ .08
27	+15.37	− 55.74	− 34.62	+57.97	+45.03	+65.26	+63.40	+12.88	+ .31	----	+ .08
Mar. 9	+38.68	− 38.09	− 80.62	−44.37	−25.60	+18.36	+61.16	+38.17	+ .04	----	+ .22
9	+40.05	− 39.25	− 82.08	−43.12	−27.33	+18.96	+63.19	+36.96	− .22	----	− .03
27	−50.05	− 52.33	− 89.57	+27.21	+26.30	+15.30	+61.80	−35.86	+ .39	----	+ .13
27	−50.66	− 53.62	− 89.83	+26.05	+27.48	+15.76	+63.22	−34.96	+ .42	----	+ .16
31	+45.27	− 44.25	− 85.94	−33.87	+44.11	+46.05	+75.28	− 2.11	+ .06	----	− .03
31	+46.30	− 45.80	− 86.79	−32.44	+44.16	+47.78	+74.28	− 0.11	+ .08	----	− .01
Apr. 1	+ 5.72	− 43.40	− 37.44	+56.16	−43.72	+42.58	+76.58	+ 5.59	− .26	----	− .12
1	+ 3.93	− 41.91	− 38.44	+56.32	−43.93	+44.47	+75.86	+ 3.57	− .14	----	.00
7	−51.27	− 56.00	− 88.73	+22.23	−21.89	+44.97	+36.32	−37.74	+ .36	----	+ .29
7	−50.78	− 54.79	− 88.63	+23.34	−20.69	+43.74	+35.70	−38.40	+ .20	----	+ .13

Observation Equations in y

DIONE$_4$—TETHYS$_3$—Continued

$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$d(\gamma \sin \theta)_4$	$d(\gamma \cos \theta)_4$	$\left(\frac{da}{a}\right)_4$	$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$d(\gamma \sin \theta)_3$	$d(\gamma \cos \theta)_3$	$\left(\frac{da}{a}\right)_3$	$\frac{C-O}{n}$	v_{11}	v_{12}
												″	″	″
−17.49	−36.34	+20.10	+56.15	− 1.95	+22.39	−19.30	+34.20	−20.26	+37.98	−21.94	+ 9.52	+0.13	----	−0.03
−17.91	−36.78	+20.42	+56.11	− 3.02	+22.05	−19.55	+34.28	−20.86	+37.36	−22.99	+ 8.98	− .02	----	− .19
−21.01	−40.04	+22.47	+53.80	−12.47	+18.52	− 2.41	+17.90	−12.10	+38.93	+18.50	+21.06	+ .09	----	− .06
−21.48	−40.46	+23.07	+53.47	−13.87	+17.96	− 3.21	+18.56	−11.64	+39.60	+17.02	+20.95	+ .13	----	− .02
+27.32	−35.40	+41.79	−24.74	+48.32	+ 3.76	−20.20	+28.60	−29.02	+11.44	−40.80	− 5.22	+ .26	----	+ .27
+27.22	−34.81	+42.09	−23.56	+48.90	+ 4.42	−20.00	+27.92	−29.26	+10.01	−41.17	− 5.92	− .01	----	.00
−24.23	−42.34	+26.96	+48.35	−24.44	+13.06	+15.22	+18.75	−27.86	+ 9.57	+41.19	+14.21	+ .22	----	+ .03
−24.56	−42.45	+27.66	+47.71	−25.66	+12.43	+14.68	+18.13	−27.40	+11.09	+40.80	+14.76	+ .16	----	− .03
+ 5.53	−23.86	+16.66	−49.69	−21.28	−26.91	−12.98	+16.59	−25.74	−15.56	−39.26	−16.25	− .04	----	− .10
+ 6.22	−24.53	+16.42	−50.23	−19.99	−26.76	−12.36	+16.12	−25.11	−17.02	−38.65	−16.72	+ .16	----	+ .11
+26.12	−42.06	+31.90	−41.28	+34.01	− 7.59	+ 5.44	+20.78	− 8.95	−40.65	− 9.55	−19.84	+ .14	----	+ .12
+26.29	−41.91	+32.52	−40.48	+34.95	− 6.98	+ 6.11	+21.44	− 8.71	−40.96	− 8.18	−19.65	+ .03	----	+ .01
−20.16	−20.69	+38.79	− 7.06	−51.99	−17.55	+16.53	+22.20	−27.09	+ 6.21	+40.50	+11.60	+ .33	----	+ .22
−19.59	−20.02	+38.26	− 8.71	−51.74	−18.17	+15.97	+21.32	−26.80	+ 8.07	+40.17	+12.35	− .02	----	− .12
+12.37	−15.50	+29.80	+25.71	+43.79	+22.72	−15.51	+21.90	−24.96	−10.57	−38.21	−11.84	+ .09	----	+ .03
+11.84	−15.37	+29.21	+26.72	+43.18	+23.00	−15.11	+21.28	−24.75	−11.85	−37.84	−12.35	+ .21	----	+ .15
−15.39	−16.79	+32.98	−19.49	−46.47	−20.54	− 0.57	+16.18	−10.68	−36.38	−15.04	−19.36	+ .17	----	+ .02
−14.74	−16.41	+32.26	−20.92	−45.84	−21.01	+ 0.31	+16.63	− 9.92	−37.02	−13.38	−19.36	+ .17	----	+ .03
+25.50	−38.75	+33.26	−29.66	+40.65	− 2.61	+ 2.10	+15.55	−12.04	+35.08	+17.70	+19.21	− .12	----	− .05
+25.57	−38.29	+33.94	−28.35	+41.59	− 1.80	+ 1.21	+15.88	−11.21	+35.86	+16.06	+19.28	− .08	----	.00
+10.10	−14.94	+26.94	+30.14	+39.68	+23.27	−16.70	+33.08	−10.38	+28.88	−26.05	+ 9.30	+ .06	----	+ .03
+10.60	−14.98	+27.49	+29.27	+40.33	+23.04	−16.98	+33.32	−10.92	+28.06	−26.94	+ 8.77	− .07	----	− .10

Normal Equations

TITAN$_6$—RHEA$_5$ 1909–10. HALL AND EPPES

$dM_6 = d\epsilon_6 - d\pi_6$

$d\epsilon_5$	$(e \sin \pi)_6$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\frac{1}{10} d\pi_6$	$d\epsilon_6$	de_6	$d(\gamma \sin \theta)_6$	$d(\gamma \cos \theta)_6$	$\left(\frac{da}{a}\right)_5$	$\left(\frac{da}{a}\right)_6$	n
165183	+ 13619	− 25896	− 47262	− 11562	− 19	− 12354	− 132757	− 4819	+ 12376	− 24869	+ 99046	+ 24.863
	205164	−261559	+ 9378	+ 13647	+18976	− 125992	− 742393	+ 38456	− 66982	− 11942	+ 120392	− 316.080
		728241	+ 8616	+ 4019	+21099	+ 163444	+1767627	− 16955	− 27072	− 31511	− 3318	+ 492.511
			260743	+ 13544	+ 3730	+ 5539	+ 26537	− 9425	− 70762	− 14628	− 11320	− 71.664
				147167	+ 4510	− 16430	+ 7711	+ 92746	− 3122	+ 25270	− 6880	+ 17.030
					43936	− 50512	+ 27203	+ 12797	− 28123	− 40841	+ 18806	+ 49.141
						1039758	+ 863729	− 214908	− 96710	− 71677	+ 97761	+ 139.390
							4935434	− 23928	+ 3985	−168130	− 126273	+1291.643
								1140028	+ 163068	+ 16822	− 48725	− 63.283
									1046185	+ 3978	+ 172860	− 484.744
										272759	− 3012	− 241.457
											1317264	−1510.470

$[nn] = 3.9239$

$[nn]_{11} = 1.3920$ $[vv]_{11} = 1.3882$

$[nn]_{12} = 1.3729$ $[vv]_{12} = 1.3701$. Number of equations 58, 58.

Probable error of one equation $\pm 0''.078$, $\pm 0''.077$.

TITAN$_6$—RHEA$_5$ 1910–11. HALL

$dM_6 = d\epsilon_6 - d\pi_6$

$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_5$	$\frac{1}{10} d\pi_6$	$d\epsilon_6$	de_6	$d(\gamma \sin \theta)_6$	$d(\gamma \cos \theta)_6$	$\left(\frac{da}{a}\right)_6$	n
123685	− 1042	− 2065	− 32310	− 7258	+ 14425	+ 9184	− 73866	+ 10119	+ 2710	− 40	+ 6024	+ 79.367
	77607	− 392	− 7089	− 3281	+ 4202	+26572	+ 4632	− 53154	− 15543	+ 6628	+ 25011	− 91.231
		547591	− 3289	− 449	+ 14090	+94665	− 89340	+1290043	− 10558	+ 3049	+ 95328	+178.569
			107658	+ 15795	+ 1655	− 6717	+ 4117	+ 8144	− 6693	+ 3822	+ 425	− 53.961
				106894	+ 31856	− 892	− 707	− 5927	+ 10071	− 61425	− 20607	+ 66.839
					130460	− 4518	− 3546	+ 6772	+ 1418	− 19452	− 12386	+ 3.876
						43619	− 25969	+ 202927	− 20115	+ 5808	+ 6509	+ 15.753
							835863	− 191317	−127260	− 7878	− 19631	−109.254
								3343605	+ 17802	+ 5774	+ 85296	+537.910
									437525	− 41232	− 24347	+ 83.198
										719167	+216016	−531.084
											538918	−554.334

$[nn] = 1.5181$

$[nn]_{11} = 0.5289$ $[vv]_{11} = 0.5283$

$[nn]_{12} = 0.4962$ $[vv]_{12} =$ ------. Number of equations 32, 32.

Probable error of one equation $\pm 0''.067$, $\pm 0''.066$.

TITAN$_6$–RHEA$_5$ 1911–12. HALL

$dM_6 = d\epsilon_6 - d\pi_6$

$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\frac{1}{10} d\pi_6$	$d\epsilon_6$	de_6	$d(\gamma \sin \theta)_6$	$d(\gamma \cos \theta)_6$	$\left(\frac{da}{a}\right)_5$	$\left(\frac{da}{a}\right)_6$	n
183907	+ 27676	+ 26495	− 63982	+ 19001	+ 23006	− 71822	+ 4266	+ 24197	+ 4468	− 23271	+ 117083	+ 56.811
	144110	+ 40888	− 44787	− 3276	+ 88291	− 4592	+ 52948	+ 31751	− 42587	+ 25074	− 6695	+ 41.210
		811686	+ 4653	− 9143	+228201	+ 106711	+1573475	− 28495	− 2531	+ 91514	− 241804	+561.279
			164500	− 26537	− 16846	+ 17709	+ 42134	− 47503	− 22791	− 1289	− 10902	−109.460
				147080	− 7713	− 40439	− 15204	+ 94697	− 67277	+ 53744	− 19060	+149.426
					132803	− 716	+ 449034	+ 47747	− 30228	+ 31715	− 26518	+144.712
						1029657	+ 275116	−334176	+ 24499	− 41292	+ 72693	−115.597
							3655157	−105025	+ 27230	+301968	− 198493	+612.193
								874925	+ 65348	+ 34127	+ 66269	+142.966
									788915	− 27522	+ 297114	−355.749
										220153	− 76436	+ 61.366
											1124575	−750.487

$[nn] = 4.1374$

$[nn]_{11} = 3.0068$ $[vv]_{11} = 3.0232$

$[nn]_{12} = 2.9860$ $[vv]_{12} =$ ------. Number of equations 48, 48.

Probable error of one equation $\pm 0''.127$, $\pm 0''.127$.

Normal Equations—Continued

TITAN$_6$–RHEA$_5$ 1913–14. HALL

$dM_6 = d\epsilon_6 - d\pi_6$

$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_6$	$\frac{1}{10} d\pi_6$	$d\epsilon_6$	de_6	$d(\gamma \sin \theta)_6$	$d(\gamma \cos \theta)_6$	$\left(\frac{da}{a}\right)_5$	$\left(\frac{da}{a}\right)_6$	n
314551	+ 38180	− 9254	− 62665	+ 65892	− 10262	− 90216	− 56130	− 21858	− 24598	− 25242	− 2224	+ 225.651
	605589	+453401	− 15846	+ 26316	+425014	− 10074	+ 552622	− 18943	+ 26861	+ 22111	+ 78527	+ 417.310
		932678	+ 24371	− 33685	+453996	− 23102	+1484886	+ 4402	− 16346	+ 71376	+ 56286	+ 630.439
			172259	+ 11739	− 6685	− 3121	+ 90120	+ 13542	+ 3107	+ 57112	+ 3153	− 25.612
				227483	+ 9352	− 4915	− 55101	− 50619	− 81253	+ 91137	− 48378	+ 181.566
					389707	− 43968	+ 643237	− 18567	− 3681	+ 27898	+ 60162′	+ 438.833
						1542833	− 182260	− 426396	+ 343361	+ 75565	− 14327	− 714.993
							3121668	+ 36629	− 30957	+162458	+ 83061	+1045.411
								1069320	− 50439	− 15488	+ 301746	+ 142.714
									1079884	− 30148	+ 395906	− 507.074
										280118	− 11711	+ 47.693
											1647794	− 298.143

$[nn] = 3.7181$

$[nn]_{11} = 2.5156$ $[vv]_{11} = 2.5289$

$[nn]_{12} = 2.5148$ $[vv]_{12} = 2.5233$. Number of equations 65, 65.

Probable error of one equation $\pm 0''.098$, $\pm 0''.099$.

TITAN$_6$–RHEA$_5$ 1914–15. HALL

$dM_6 = d\epsilon_6 - d\pi_6$ $d\epsilon_5 = \frac{1}{12} g$ $d(\gamma \sin \theta)_6 = \frac{1}{10} p$ $d\pi_6 = \frac{10}{6} s$ $d(\gamma \sin \theta)_6 = \frac{1}{25} v$

$de_6 = u \ -0.7\ (e \cos \pi)_5$ $h = \frac{1}{20} h'$ $d(\gamma \cos \theta)_5 = \frac{1}{12} q$ $d\epsilon_6 = \frac{1}{30} t$ $d(\gamma \cos \theta)_6 = \frac{1}{20} w$

$(e \sin \pi)_5 = h \ -0.08\ d\pi_6$ $(e \cos \pi)_5 = \frac{1}{12} l$ $\left(\frac{da}{a}\right)_5 = \frac{1}{12} r$ $u = \frac{1}{30} u'$ $\left(\frac{da}{a}\right) = \frac{1}{30} z$

g	p	q	r	t	v	w	z	h'	s	l	u'	n
1797.5	− 397.4	+ 585.7	− 137.7	− 126.2	+ 227.4	− 27.3	+ 171.4	− 474.6	+ 42.4	+ 1.4	− 471.2	− 0.4
	1570.6	− 50.0	+ 520.2	+ 46.9	− 326.6	− 118.9	− 130.4	+ 117.5	− 173.8	+ 304.6	− 289.1	−21.9
		1412.0	+ 393.4	− 123.1	+ 365.3	− 139.7	+ 89.4	+ 67.2	− 118.9	+ 175.6	− 276.7	+ 8.5
			1954.3	− 377.0	− 5.0	− 85.8	− 328.0	+ 81.8	+ 239.1	+ 90.2	+ 85.8	+ 5.6
				1681.0	− 441.5	+ 522.4	+ 181.1	− 102.0	− 316.5	+ 59.5	− 85.1	−32.4
					1836.3	− 2.0	+ 607.0	+ 42.3	− 62.4	− 89.0	+ 30.4	+ 5.2
						1960.8	+ 380.3	+ 76.8	− 159.5	+ 97.3	− 200.5	−22.8
							1539.6	+ 58.6	− 40.1	+ 13.3	+ 37.9	−10.0
								1814.8	− 286.6	+ 794.6	+ 424.2	+13.1
									1787.4	− 281.5	+ 683.6	+40.7
										2175.6	−1123.0	− 7.8
											1912.3	+30.7

$[nn] = 6.95$

$[nn]_{11} = 4.99$ $[vv]_{11} = 5.101$

$[nn]_{12} = 4.98$ $[vv]_{12} = 5.082$. Number of equations 60, 60.

Probable error of one equation $\pm 0''.146$, $\pm 0''.146$.

TITAN$_6$–RHEA$_5$ 1915–16. HALL

$dM_6 = d\epsilon_6 - d\pi_6$

$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_6$	$d(\gamma \cos \theta)_6$	$\frac{1}{10} d\pi_6$	$d\epsilon_6$	de_6	$d(\gamma \sin \theta)_6$	$d(\gamma \cos \theta)_6$	$\left(\frac{da}{a}\right)_6$	$\left(\frac{da}{a}\right)_6$	n
118244	− 6982	+ 18261	− 8873	+30755	+ 145	+ 61955	− 11547	− 14247	+ 7150	− 2953	− 14388	+ 57.806
	428252	+119113	+ 455	+ 67	+261900	+ 59409	+ 6665	− 15899	− 5974	− 19485	− 41446	+ 10.890
		146628	+ 1051	+ 9559	+ 89155	− 11486	+178604	+ 8527	+ 26332	− 11290	− 1305	+ 53.605
			80917	+ 7508	− 5172	+ 691	− 2672	+ 48998	+ 17290	+ 36689	+ 23967	− 30.874
				73514	− 145	+ 11500	+ 30035	− 15290	+ 23134	+ 14636	− 3661	+ 39.641
					184987	+ 31437	+ 27411	− 987	+ 808	− 10305	− 20326	+ 19.368
						529532	+ 13383	− 70905	+201101	+ 34152	− 468	−305.020
							558193	+ 31339	+ 68566	− 16765	+ 4071	+ 60.026
								384152	− 35802	+ 19534	+156646	− 61.415
									449546	+ 10833	+ 50920	−177.548
										101880	+ 40224	− 98.074
											644165	−253.673

$[nn] = 1.7370$

$[nn]_{11} = 1.3313$ $[vv]_{11} = 1.3313$

$[nn]_{12} = 1.3208$ $[vv]_{12} = 1.3207$. Number of observations 25, 25.

Probable error of one equation $\pm 0''.125$, $\pm 0''.126$.

Normal Equations—Continued

RHEA₅–DIONE₄ 1909–10. HALL

$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$d(\gamma \sin \theta)_4$	$d(\gamma \cos \theta)_4$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_4$	$\left(\frac{da}{a}\right)_5$	n
27596.5	+13082.6	−41401.5	−4371.8	−3383.2	−6548.0	−18499.2	+27989.6	+2734.0	+3408.2	+8820.3	−20561.0	+119.800
	16122.5	−28466.9	+4393.6	+5980.8	−4933.9	−21077.2	+28224.5	−4860.2	−2320.4	+4312.7	−8217.2	+102.700
		121794.7	+1512.2	+2465.7	−133.4	+54113.0	−129439.1	−2649.0	+570.1	−17103.5	+28335.1	−402.406
			20010.0	+7288.2	+2213.2	−4446.0	+815.1	−7256.5	−12081.5	+117.3	−1780.7	+8.802
				31014.8	+4856.0	−13339.7	−2091.2	−20769.5	−16517.6	+5301.6	−1724.5	−30.236
					36134.0	+5543.8	−4526.6	−13064.6	−2156.5	−11542.2	−11378.7	+23.176
						51177.5	−62283.5	+10754.0	+3507.5	−24194.0	+10832.1	−163.676
							164562.7	+3383.9	−502.1	+22576.3	−17994.3	+450.928
								70553.7	+1495.8	−3399.0	−4263.2	−11.460
									28978.3	−2346.1	+5234.2	+6.976
										27522.5	−18774.1	+35.398
											71183.0	−113.655

$[nn] = 1.8802$

$[nn]_{11} = 0.3848$ $[vv]_{11} = 0.3848$

$[nn]_{12} = 0.3592$ $[vv]_{12} = 0.3592$. Number of equations 14, 14.

Probable error of one equation $\pm 0''.101$, $\pm 0''.101$.

RHEA₅–DIONE₄ 1910–11. HALL

$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$d(\gamma \sin \theta)_4$	$d(\gamma \cos \theta)_4$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_4$	$\left(\frac{da}{a}\right)_5$	n
25205.9	−1216.1	+9964.4	−6277.8	−1545.3	+11462.4	+3094.0	−15999.3	+853.5	+498.2	+2974.6	+3659.1	−74.1200
	15109.4	+1609.6	−2944.0	−2656.7	+2893.2	−10582.1	+2829.1	−1319.2	−102:7	+172.4	+3178.5	+39.6051
		110484.7	−1540.6	+498.4	+415.9	+12242.4	−136586.0	−522.2	+44.3	+3238.9	+9022.8	−350.8433
			20254.4	+2882.4	+1032.1	+1663.6	+3157.5	−3618.7	−2865.3	+139.3	−694.4	−8.5014
				21800.2	−1094.7	+2896.7	−363.0	+1894.0	+10298.5	+6522.7	+3156.2	−13.4955
					45506.5	−5513.7	−799.5	−13236.1	−1018.3	−1698.4	−388.6	−68.8702
						31378.1	−11237.1	+2523.5	−43.7	−5832.5	+960.3	−42.8446
							202376.4	−362.2	+823.9	−13680.4	−9085.4	+482.0497
								44074.9	+104.8	+904.6	−1116.6	−15.1680
									37942.0	+3234.0	+11359.5	−6.5630
										24779.4	−2698.5	−16.1599
											51712.3	−72.6493

$[nn] = 2.1677$

$[nn]_{11} = 0.6658$ $[vv]_{11} = 0.6658$

$[nn]_{12} = 0.6400$ $[vv]_{12} = 0.6401$. Number of equations 12, 12.

Probable error of one equation $\pm 0''.153$, $\pm 0''.156$.

RHEA₅–DIONE₄ 1911–12. HALL

$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$d(\gamma \sin \theta)_4$	$d(\gamma \cos \theta)_4$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_4$	$\left(\frac{da}{a}\right)_5$	n
45954.3	+3941.7	+8271.6	−11643.5	−2229.6	+22703.4	−16211.2	−21320.3	−2831.5	−10806.7	+9594.8	−2403.3	−109.636
	45256.2	+44862.7	−10946.9	−2467.2	+15281.6	−36380.9	−66270.2	−19141.2	+1641.8	+7640.6	+20894.6	−235.165
		177157.4	+1192.2	−467.1	+5978.3	−25490.0	−248375.0	+473.6	+569.3	+15728.5	+63974.8	−631.914
			31322.6	+10153.2	−1188.9	+12169.5	−1191.9	+8115.6	+29852.9	+5543.5	+11870.4	+20.664
				33328.8	−265.7	+124.9	+3870.3	+3969.5	+15527.8	+13448.1	+6033.6	+16.077
					96665.9	−39988.5	−2095.1	−17724.2	+9057.0	+32581.2	−15793.9	−106.573
						57007.5	+23408.3	+30483.7	−1219.7	−9322.6	−12472.4	+175.180
							397393.9	−3960.8	+6921.5	−28818.2	−75592.1	+921.274
								44633.1	−10720.7	+1708.1	−1311.5	+50.358
									81438.2	+7642.7	+30429.3	+24.730
										38580.8	+6369.5	−111.223
											67740.9	−218.696

$[nn] = 3.2762$

$[nn]_{11} = 0.6603$ $[vv]_{11} = 0.6728$

$[nn]_{12} = 0.6340$ $[vv]_{12} =$ ------. Number of equations 19, 19.

Probable error of one equation $\pm 0''.107$, $\pm 0''.106$.

Normal Equations—Continued

RHEA$_5$–DIONE$_4$ 1914–15. HALL

$(e \sin \pi)_5 = t + 0.7\,(e \sin \pi)_4$ $\quad d\epsilon_4 = \frac{1}{5}\,g$ $\quad d(\gamma \sin \theta)_4 = 0.15\,p$ $\quad d\epsilon_5 = \frac{1}{11}\,s$ $\quad d(\gamma \sin \theta)_5 = \frac{1}{10}\,v$

$(e \cos \pi)_5 = u + 0.8\,(e \cos \pi)_4$ $\quad (e \sin \pi)_4 = \frac{1}{5}\,h$ $\quad d(\gamma \cos \theta)_4 = \frac{1}{4}\,q$ $\quad t = \frac{1}{20}\,t'$ $\quad d(\gamma \cos \theta)_5 = \frac{1}{5}\,w$

$(e \cos \pi)_4 = \frac{1}{6}\,l$ $\quad \left(\frac{da}{a}\right)_4 = \frac{1}{8}\,r$ $\quad u = \frac{1}{16}\,u'$ $\quad \left(\frac{da}{a}\right)_5 = \frac{1}{12}\,z$

g	p	q	r	s	v	w	z	h	l	t'	u'	n
1873.8	-423.7	+671.9	-117.2	-133.4	+150.2	-78.2	+176.3	+72.0	-253.8	+401.1	+435.6	-58.1
	2090.2	+87.0	+725.6	+39.2	-207.0	-39.2	-87.2	+15.1	+101.2	-65.4	+142.2	+26.7
		2195.6	+589.9	-181.5	+348.1	-264.9	+62.4	-250.2	-125.8	-169.2	+217.7	-15.1
			2317.0	-252.4	+21.0	-88.3	-366.7	-475.0	+343.0	-412.8	-59.6	+1.1
				2221.1	-641.6	+841.0	+142.4	-351.6	-41.3	-249.0	-494.2	+17.4
					2065.0	-306.2	+634.2	-164.3	+131.4	-78.0	+62.1	-26.9
						2277.9	+383.5	+259.7	+69.1	+185.4	-267.1	+16.9
							2195.8	+195.5	-553.3	+255.4	+211.7	-31.6
								2592.5	-218.9	+336.1	-116.0	-25.8
									2198.5	-123.5	+674.0	+19.4
										2154.0	+1121.4	+20.0
											2068.0	-9.2

$[nn] = 7.24$

$[nn]_{11} = 3.57$ $[vv]_{11} = 3.570$

$[nn]_{12} = 3.56$ $[vv]_{12} = 3.523$. Number of equations 64, 64.

Probable error of one equation $\pm 0''.118$, $\pm 0''.118$.

RHEA$_5$–TETHYS$_3$ 1909–10. HALL

$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$d(\gamma \sin \theta)_3$	$d(\gamma \cos \theta)_3$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_3$	$\left(\frac{da}{a}\right)_5$	n
9283.7	+9568.9	-9445.0	-805.5	-300.4	-3324.0	-7981.6	+17794.5	-1795.2	-748.8	-583.2	-4135.6	-61.3718
	11662.2	-14377.0	-1933.7	+358.9	-1390.9	-12882.9	+24093.6	-3895.0	-2059.2	-2756.0	-10210.9	-73.6830
		30236.7	-920.9	-314.3	+5630.8	+18462.3	-47871.7	-2412.4	-503.7	+9861.4	+24899.9	+139.0519
			4415.2	-1514.2	-1811.1	+3821.2	+1346.7	+8197.3	+5279.4	-609.8	+445.6	-14.6247
				8575.9	+147.9	-751.0	-447.4	-236.0	-3205.2	+1731.0	-593.8	-6.8865
					18662.8	-5521.1	-17146.3	-4545.0	-1073.3	+965.5	-2956.5	+57.1690
						19810.1	-26769.7	+9120.9	+2662.0	+5573.7	+18111.7	+70.0749
							80823.4	+2003.9	+2120.3	-14709.9	-34687.1	-239.9267
								25579.4	-62.2	-565.3	-1586.8	-20.3799
									15969.2	-1072.4	+2874.5	-27.2633
										4763.8	+9712.6	+35.4658
											25975.7	+87.3706

$[nn] = 0.8173$

$[nn]_{11} = 0.0005$ $[vv]_{11} = 0.0002$

$[nn]_{12} = 0.0001$ $[vv]_{12} = 0.0000$. Number of equations 6, 6.

RHEA$_5$–TETHYS$_3$ 1910–11. HALL

$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$d(\gamma \sin \theta)_3$	$d(\gamma \cos \theta)_3$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_3$	$\left(\frac{da}{a}\right)_5$	n
15126.9	+2848.0	+602.5	-1685.8	+322.6	+2982.1	+2975.1	+6953.9	-444.1	-654.2	-2795.6	-6805.2	+64.4668
	6133.6	-5402.1	+1079.2	+696.3	+750.8	-5551.7	+7843.1	-1193.6	-632.6	-2108.7	-453.3	+31.2411
		61556.1	-200.7	-172.2	-3153.8	+10323.1	-94845.9	+307.3	+320.5	+361.7	-1669.0	-94.2587
			6379.7	-3391.2	-723.7	-880.5	-684.7	+2364.9	+2232.2	-1452.0	+565.2	+32.8939
				12454.5	+1765.4	+966.1	-1491.5	-6478.4	+2077.9	+3769.9	+760.1	-41.1927
					37810.3	+457.0	+3039.5	-8307.8	-443.5	+2667.8	-783.4	+13.5505
						20790.0	-7427.3	+1575.7	+366.9	+4636.4	-1813.9	-11.8501
							164225.5	+405.0	-485.2	+4009.7	-232.7	+187.5770
								27873.4	-693.0	-1816.8	-1085.4	+45.3600
									32383.8	+476.5	+9875.3	-14.9122
										7180.1	+2566.9	-35.2140
											33759.5	-106.5871

$[nn] = 1.1464$

$[nn]_{11} = 0.1649$ $[vv]_{11} = 0.1651$

$[nn]_{12} = 0.1620$ $[vv]_{12} = 0.1622$. Number of equations 9, 9.

Probable error of one equation $\pm 0''.104$, $\pm 0''.111$.

Normal Equations—Continued

RHEA$_5$–TETHYS$_3$ 1911–12. BURTON

$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$d(\gamma \sin \theta)_3$	$d(\gamma \cos \theta)_3$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_3$	$\left(\frac{da}{a}\right)_5$	n
25325.8	+10156.2	+34685.2	− 7435.0	− 1231.0	+ 1283.7	− 3118.2	− 51764.4	− 242.3	− 2561.7	+ 5003.1	− 3239.1	− 16.1075
	31817.0	+30333.5	− 1822.2	− 9017.2	− 5467.7	−37122.3	− 53858.5	+ 9869.6	− 1293.9	+ 4202.9	−12395.5	− 46.6725
		94768.9	− 2354.5	+ 2518.3	−11058.6	−18047.5	−154995.5	− 4979.0	+ 2735.4	+ 1586.5	−27534.4	− 24.5923
			20196.4	+ 5203.8	− 29.9	+ 1621.0	− 1064.1	+ 617.9	+ 5808.4	+ 2645.3	+ 2377.3	+ 4.0496
				18700.7	+ 484.8	+20547.7	− 5642.2	− 599.5	+ 417.9	+ 7273.0	+ 264.2	+ 34.1210
					65934.9	+12244.2	+ 1225.8	−29254.8	+ 8878.7	+ 8582.2	−10788.9	− 9.2153
						76785.4	+ 20714.3	−25160.5	− 3068.7	+ 9073.0	+21595.3	+ 32.8344
							283758.1	+ 1251.3	− 1598.3	− 9665.8	+39712.0	+103.8163
								73882.3	−14877.7	− 520.4	− 974.9	− 60.7433
									50529.4	+ 748.8	+18538.0	+ 25.0058
										25287.8	− 423.3	+ 1.1445
											96794.0	− 81.3227

[nn] =0.5832
[nn]$_{11}$=0.2421 [vv]$_{11}$=0.2426
[nn]$_{12}$=0.2114 [vv]$_{12}$=...... Number of equations 19, 19.
Probable error of one equation ±0″.064, ±0″.061.

RHEA$_5$–TETHYS$_3$ 1912–13. BURTON

$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$d(\gamma \sin \theta)_3$	$d(\gamma \cos \theta)_3$	$d\epsilon_5$	$(e \sin \pi)_5$	$(e \cos \pi)_5$	$d(\gamma \sin \theta)_5$	$d(\gamma \cos \theta)_5$	$\left(\frac{da}{a}\right)_3$	$\left(\frac{da}{a}\right)_5$	n
24982.1	− 4273.6	− 8053.5	−11151.7	+ 3956.8	+ 1398.1	+ 7925.1	+ 18375.9	+ 838.9	+ 2089.4	+ 767.0	− 2515.6	+ 74.5292
	51515.9	+26041.9	+ 4108.3	+ 175.0	−11847.7	− 65471.1	− 64881.1	− 5284.1	+10895.2	− 106.1	+22884.6	− 71.8093
		82837.3	− 366.5	− 1857.0	−15535.9	− 47423.7	−153106.8	+ 4729.9	− 4564.7	− 2465.8	+22589.6	−200.6396
			24518.0	− 2216.6	+ 230.6	− 1810.5	− 250.3	− 1682.9	− 2463.0	+ 3362.2	− 1192.0	− 48.3459
				17019.2	+ 997.7	− 1417.4	+ 1337.9	− 929.5	+ 4103.6	+ 6876.0	+ 1286.4	+ 51.8782
					95728.7	+ 34.0	+ 51580.7	−27058.2	+11584.2	− 4794.4	+ 841.6	+ 20.5770
						136638.2	+106500.6	+15176.7	−13174.5	+ 6868.9	−23781.9	+138.8904
							338611.6	− 5900.0	+11812.5	+16222.6	−38846.1	+417.9298
								65896.7	+ 1406.9	− 1189.5	+12758.8	+ 29.1628
									67010.3	+ 1071.9	+28042.9	+ 50.7174
										34430.6	− 255.7	+ 20.1276
											92338.9	− 71.7777

[nn] =1.1264
[nn]$_{11}$=0.2798 [vv]$_{11}$=0.2786
[nn]$_{12}$=0.2796 [vv]$_{12}$=...... Number of equations 21, 21.
Probable error of one equation ±0″.064, ±0″.065.

RHEA$_5$–TETHYS$_3$ 1914–15. HALL

$(e \sin \pi)_5 = t + 0.55\ (e \sin \pi)_3$ $\quad d\epsilon_3 = {}^1/_7\ g$ $\quad d(\gamma \sin \theta)_3 = {}^1/_6\ p$ $\quad d\epsilon_5 = {}^1/_{11}\ s$ $\quad d(\gamma \sin \theta)_5 = {}^1/_{10}\ v$

$(e \cos \pi)_5 = u + 0.6\ (e \cos \pi)_3$ $\quad (e \sin \pi)_3 = {}^2/_9\ h$ $\quad d(\gamma \cos \theta)_3 = {}^1/_6\ q$ $\quad t = {}^1/_{20}\ t'$ $\quad d(\gamma \cos \theta)_5 = {}^1/_8\ w$

$(e \cos \pi)_3 = {}^4/_{21}\ l$ $\quad \left(\frac{da}{a}\right)_3 = {}^1/_6\ r$ $\quad u = {}^1/_{14}\ u'$ $\quad \left(\frac{da}{a}\right)_5 = {}^1/_{12}\ z$

g	p	q	r	s	v	w	z	h	t'	l	u'	n
1939.3	− 507.0	+ 525.5	+ 254.7	− 75.2	− 118.3	− 105.6	+ 180.6	+ 203.6	− 136.7	+ 350.7	− 301.7	+46.9
	2073.5	+ 13.0	+ 786.3	− 94.6	+ 180.5	− 156.7	+ 35.6	+ 62.4	+ 19.9	− 95.7	+ 27.6	−12.4
		1919.5	+ 478.3	− 120.0	− 189.5	− 582.5	− 174.5	+ 303.0	+ 226.3	− 125.3	− 536.0	−18.1
			2408.4	+ 339.2	+ 36.5	− 163.6	− 15.0	+ 79.8	+ 455.3	− 83.4	+ 286.3	+20.5
				2278.6	− 721.2	+ 830.8	+ 356.5	− 173.7	− 323.7	− 491.4	− 173.0	+31.7
					2334.3	− 377.9	+ 725.6	− 175.7	+ 53.9	+ 73.3	− 119.8	−11.6
						2480.7	+ 337.9	− 83.9	− 20.0	+ 22.7	+ 80.2	+16.7
							2159.7	− 215.3	− 74.6	− 74.5	− 163.8	+ 3.2
								2008.4	+ 323.6	− 39.7	− 110.6	−23.3
									2308.3	+ 29.9	+1240.5	− 8.0
										1938.0	+ 578.1	+ 8.4
											2501.7	+29.4

[nn] =7.02
[nn]$_{11}$=4.06 [vv]$_{11}$=4.121
[nn]$_{12}$=4.04 [vv]$_{12}$=4.039. Number of equations 66, 66
Probable error of one equation ±0″.124, ±0″.124.

Normal Equations—Continued

DIONE$_4$–TETHYS$_3$ 1909–10. HALL

$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$d(\gamma \sin \theta)_3$	$d(\gamma \cos \theta)_3$	$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$d(\gamma \sin \theta)_4$	$d(\gamma \cos \theta)_4$	$\left(\frac{da}{a}\right)_3$	$\left(\frac{da}{a}\right)_4$	n
18012.0	+ 8691.2	− 126.8	− 4015.4	− 66.5	+ 1813.4	− 4442.0	+ 10011.8	+ 998.5	+ 1306.8	− 7216.1	+12373.6	+ 32.3937
	29903.9	−32857.5	− 2025.3	+ 184.9	− 7414.0	−23208.0	+ 55187.0	− 2396.8	− 2432.4	− 7050.7	+ 702.9	−111.6484
		62035.6	− 1438.0	− 785.4	+ 4038.0	+30109.4	− 89118.0	− 1617.7	+ 63.6	+11962.7	+15224.1	+186.5955
			21352.9	− 4702.1	+ 2066.5	+ 1536.4	+ 1142.0	− 7390.0	− 7598.9	− 2630.9	− 938.2	− 25.0243
				13570.1	− 1617.7	+ 967.9	− 43.5	+ 7805.0	+ 3003.0	+ 2877.5	+ 50.2	− 1.2971
					36149.0	+ 6137.6	− 12682.5	− 4454.1	− 2008.4	− 4966.4	+ 2196.3	− 28.5391
						25750.2	− 48813.7	+ 5149.3	+ 2362.9	+ 9049.9	+ 5402.6	+ 68.4315
							144547.2	+ 872.4	+ 25.1	−19917.6	− 8635.3	−258.0821
								22876.9	− 928.2	+ 2285.1	− 1632.2	+ 28.1233
									34404.8	+ 1272.5	+ 6353.9	− 29.1219
										19886.9	− 6601.1	+ 38.5225
											25697.3	+ 3.7289

$[nn] = 1.5563$

$[nn]_{11} = 0.4059$ $[vv]_{11} = 0.4060$

$[nn]_{12} = 0.3691$ $[vv]_{12} = 0.3691$. Number of equations 16, 16.

Probable error of one equation ±0″.094, ±0″.092.

DIONE$_4$–TETHYS$_3$ 1910–11. HALL

$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$d(\gamma \sin \theta)_3$	$d(\gamma \cos \theta)_3$	$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$d(\gamma \sin \theta)_4$	$d(\gamma \cos \theta)_4$	$\left(\frac{da}{a}\right)_3$	$\left(\frac{da}{a}\right)_4$	n
13912.6	+1103.5	− 5948.0	− 4567.2	+ 40.4	+ 5241.5	+ 1573.6	+ 7534.0	− 2372.2	− 1591.1	− 2385.3	+ 2102.4	+ 7.8083
	9221.0	− 3078.4	+ 3827.7	+ 1928.3	+ 408.8	− 6300.2	+ 4003.0	− 2013.0	+ 487.3	− 1097.3	− 2032.7	+ 17.8293
		64557.8	+ 869.2	+ 217.5	− 2775.0	− 3074.2	− 79954.8	+ 2083.2	+ 501.1	− 7043.8	+ 9838.9	+168.3526
			16570.4	− 2432.1	− 2412.7	− 4128.0	+ 400.9	+ 8185.4	+ 4312.4	− 1506.2	+ 1033.0	+ 44.8565
				10525.1	− 741.5	− 2463.4	− 763.0	+ 1726.1	+ 4361.2	+ 3260.8	+ 1360.8	− 43.9734
					24799.3	− 4753.2	+ 7601.0	− 7109.9	− 2253.1	+ 5023.2	+ 5095.4	− 80.3638
						17109.1	+ 4417.6	+ 3297.6	+ 714.1	− 4057.8	− 4262.2	+ 16.7646
							110151.0	+ 86.3	+ 837.9	+13192.7	− 9694.0	−235.5190
								22869.4	+ 5304.7	+ 453.8	+ 829.1	− 0.3372
									21581.1	+ 1313.6	+ 6450.3	+ 18.0156
										18133.5	+10202.0	−128.4174
											28071.5	− 29.2037

$[nn] = 1.7553$

$[nn]_{11} = 0.3333$ $[vv]_{11} = 0.3331$

$[nn]_{12} = 0.2783$ $[vv]_{12} =$ ...... Number of equations 13, 13.

Probable error of one equation ±0″.101, ±0″.095.

DIONE$_4$–TETHYS$_3$ 1911–12. BURTON

$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$d(\gamma \sin \theta)_3$	$d(\gamma \cos \theta)_3$	$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$d(\gamma \sin \theta)_4$	$d(\gamma \cos \theta)_4$	$\left(\frac{da}{a}\right)_3$	$\left(\frac{da}{a}\right)_4$	n
27404.5	+ 3567.7	− 7707.0	− 7442.7	+ 825.2	+10467.8	−10381.7	+ 10229.7	+ 809.5	− 2603.5	− 714.4	+ 3661.5	+ 3.8756
	26270.4	+ 22087.4	− 4039.8	+ 1744.3	− 1009.3	−24983.6	− 33974.4	+ 2795.3	+ 2090.0	+ 389.6	− 1421.0	−108.7721
		109096.3	− 539.0	+ 656.9	− 9461.5	−17379.8	−144836.3	+ 140.9	− 688.4	+ 5764.2	+ 4158.4	−350.3715
			19486.7	+ 86.5	+ 1125.0	+ 3654.7	− 2572.5	− 2029.7	+ 7441.0	+ 572.3	+ 2975.9	− 7.8653
				21326.9	− 1692.5	− 2018.0	+ 2182.8	+ 5386.3	+ 9489.6	+ 8029.8	+ 3956.6	− 47.4483
					56534.9	+ 4367.8	+ 19387.0	− 7748.9	+ 3568.1	+ 6895.3	− 6694.9	+155.0195
						38588.7	+ 32692.8	− 143.9	− 427.6	+ 7780.1	− 5444.3	+128.7848
							218925.4	+ 2235.7	− 886.0	−10240.5	+ 3739.3	+537.5703
								19411.8	− 3514.5	+ 2025.3	− 243.1	− 9.8010
									47537.7	+ 3433.8	+18471.8	− 18.9449
										25759.7	− 1665.9	+ 3.9211
											31363.9	− 22.3947

$[nn] = 2.1625$

$[nn]_{11} = 0.3896$ $[vv]_{11} = 0.3950$

$[nn]_{12} = 0.3670$ $[vv]_{12} =$ ...... Number of equations 20, 20.

Probable error of one equation ±0″.079, ±0″.077.

Normal Equations—Continued

DIONE$_4$–TETHYS$_3$ 1912–13. BURTON

$d\epsilon_3$	$(e \sin \pi)_3$	$(e \cos \pi)_3$	$d(\gamma \sin \theta)_3$	$d(\gamma \cos \theta)_3$	$d\epsilon_4$	$(e \sin \pi)_4$	$(e \cos \pi)_4$	$d(\gamma \sin \theta)_4$	$d(\gamma \cos \theta)_4$	$\left(\frac{da}{a}\right)_3$	$\left(\frac{da}{a}\right)_4$	n
25253.0	− 1725.7	− 2983.8	−12352.5	+ 3871.9	− 5106.7	+ 3374.3	+ 2723.4	+ 2420.7	+ 1061.6	+ 1996.6	+ 2034.9	+ 57.0148
	53554.7	+27922.4	+ 3255.1	+ 283.1	− 9581.8	−56113.9	− 45897.8	− 3968.3	+ 4834.7	− 1884.1	+ 5773.0	+191.4665
		84386.3	+ 261.9	− 425.3	− 9600.8	−38770.3	−117697.5	+ 1576.3	− 5278.0	− 3428.7	+12124.1	+210.7930
			27447.0	− 2582.4	+ 1485.9	− 7070.7	+ 2336.0	− 5129.9	− 3762.4	+ 3864.9	− 2536.2	− 35.9741
				16038.2	− 1120.5	+ 676.7	− 27.2	+ 1525.2	− 2868.8	+ 6474.0	− 897.0	+ 43.6750
					53181.0	+ 4715.7	+ 19298.3	−13899.6	+ 5743.7	− 5145.4	− 21.2	−242.5166
						78844.5	+ 65012.1	+ 5169.4	− 4940.4	− 2946.4	− 8240.6	−224.3113
							181852.8	− 1149.4	+ 6413.7	− 3964.2	−16663.5	−326.3764
								33666.4	+ 1839.9	− 284.1	+ 6711.6	+ 72.7792
									37664.2	− 1706.2	+16207.6	− 56.3285
										36925.7	− 5433.1	+ 15.6604
											47969.7	− 38.8180

$[nn] = 2.3659$

$[nn]_{11} = 0.3161$ $[vv]_{11} = 0.3234$

$[nn]_{12} = 0.2934$ $[vv]_{12} =$ ...... Number of equations 22, 22.

Probable error of one equation ±0″.067, ±0″.065.

DIONE$_4$–TETHYS$_3$ 1914–15. HALL

$(e \sin \pi)_4 = t + 0.8\ (e \sin \pi)_3$ $d\epsilon_3 = \frac{1}{6} g$ $d(\gamma \sin \theta)_3 = \frac{1}{5} p$ $d\epsilon_4 = \frac{1}{8} s$ $d(\gamma \sin \theta)_4 = \frac{1}{6} v$

$(e \cos \pi)_4 = u + 0.75\ (e \cos \pi)_3$ $(e \sin \pi)_3 = \frac{2}{9} h$ $d(\gamma \cos \theta)_3 = \frac{1}{5} q$ $t = \frac{1}{13} t'$ $d(\gamma \cos \theta)_4 = \frac{1}{7} w$

$(e \cos \pi)_3 = \frac{1}{5} l$ $\left(\frac{da}{a}\right) = \frac{1}{6} r$ $u = \frac{1}{11} u'$ $\left(\frac{da}{a}\right)_4 = \frac{1}{8} z$

g	p	q	r	s	v	w	z	h	t'	l	u'	n
2665.8	− 541.9	+ 729.6	− 43.0	+ 319.8	+ 101.6	− 295.2	+ 741.7	− 137.8	+ 119.7	+ 32.8	− 125.8	+48.9
	2540.3	+ 258.3	+ 846.0	− 127.7	+ 702.5	+ 55.2	+ 223.1	− 54.4	− 136.9	+ 42.1	+ 122.0	− 8.8
		2436.7	+ 670.6	− 497.0	+ 805.4	− 880.3	+ 18.3	+ 17.9	+ 46.3	+ 29.9	− 96.5	+ 3.9
			2456.7	+ 56.5	+ 441.4	− 174.8	− 605.4	+ 36.0	+ 326.8	+ 41.5	+ 246.3	−10.1
				2297.9	− 605.7	+ 803.8	− 82.2	− 66.7	+ 191.0	+ 58.7	+ 99.8	−44.2
					2651.4	− 66.1	+ 782.1	+ 80.9	− 90.6	+ 115.8	+ 81.6	+24.8
						2217.7	+ 540.0	+ 52.0	− 3.5	− 19.0	− 44.8	−23.4
							2473.2	− 199.4	+ 117.0	+ 32.2	+ 114.2	+18.6
								2280.5	+ 551.1	+ 70.0	+ 188.1	−12.4
									2593.5	+ 20.1	+1397.9	−53.6
										2382.8	+ 432.4	+ 3.1
											2546.1	−16.4

$[nn] = 6.34$

$[nn]_{11} = 2.81$ $[vv]_{11}$ ....

$[nn]_{12} = 2.81$ $[vv]_{12} = 2.810$. Number of equations 67, 67.

Probable error of one equation ±0″.102, ±0″.102.

Solution of Normal Equations and Probable Errors, 11 Unknowns (unit=0.00001)

TITAN

From	$d\epsilon$	de	$d\pi$	$d(\gamma \sin \theta)$	$d(\gamma \cos \theta)$	$\left(\frac{da}{a}\right)$
1909–10—Titan-Rhea	− 21± 11	+ 39± 14	− 719±424	+ 0± 8	+ 30± 8	+108± 7
1910–11—Titan-Rhea	+ 2 8	+ 32 15	+ 961 556	− 5 11	+ 43 9	+ 92 11
1911–12—Titan-Rhea	+ 7 14	+ 58 20	− 39 840	− 6 16	+ 30 16	+ 26 15
1913–14—Titan-Rhea	+ 30 9	− 7 12	−1256 419	− 10 10	+ 24 10	+ 16 8
1914–15—Titan-Rhea	+ 42 13	− 17 21	−3172 710	+ 8 16	+ 30 18	+ 15 14
1915–16—Titan-Rhea	+ 61 21	− 13 26	− 353 846	+ 10 23	+ 13 21	+ 36 15

RHEA

From	$d\epsilon$	$e \sin \pi$	$e \cos \pi$	$d(\gamma \sin \theta)$	$d(\gamma \cos \theta)$	$\left(\frac{da}{a}\right)$
1909–10—Titan-Rhea	− 55± 21	+ 99± 29	− 117± 32	+ 36± 16	− 40± 21	+108± 7
Rhea-Dione	+ 86 358	+ 45 240	+ 95 560	+ 84 71	+ 10 113	+145 198
Rhea-Tethys	−8009 ---	−11501 ---	−7698 ---	+ 928 ---	+289 ---	−298 ---
1910–11—Titan-Rhea	− 84± 22	+ 66± 32	− 142± 39	+ 33± 22	− 54± 22	+ 92± 11
Rhea-Dione	+ 174 84	− 73 108	− 57 91	+ 87 78	− 1 87	+ 78 65
Rhea-Tethys	− 67 57	+ 17 102	− 218 106	− 110 69	− 20 62	+262 59
1911–12—Titan-Rhea	+ 8± 35	+ 24± 58	− 179± 46	+ 56± 36	− 84± 37	+ 26± 15
Rhea-Dione	+ 33 44	+ 99 111	+ 9 63	− 89 73	−101 56	+ 46 47
Rhea-Tethys	+ 117 54	+ 65 70	− 8 89	+ 137 47	− 91 37	+131 31
1912–13—Rhea-Tethys	+ 32± 25	− 41± 30	− 127± 32	− 50± 28	− 54± 27	+ 65± 22
1913–14—Titan-Rhea	− 59± 20	+ 44± 28	− 21± 27	− 1± 25	− 63± 22	+ 16± 8
1914–15—Titan-Rhea	+ 26± 34	+ 211± 51	+ 1± 44	+ 123± 41	− 72± 37	+ 15± 14
Rhea-Dione	+ 2 27	+ 56 36	− 23 34	+ 76 29	− 61 32	+ 84 21
Rhea-Tethys	− 127 29	+ 162 36	− 81 36	− 14 30	− 12 35	+ 21 23
1915–16—Titan-Rhea	− 67± 44	+ 14± 55	+ 6± 60	− 5± 48	− 38± 52	+ 36± 15

DIONE

From	$d\epsilon$	$e \sin \pi$	$e \cos \pi$	$d(\gamma \sin \theta)$	$d(\gamma \cos \theta)$	$\left(\frac{da}{a}\right)$
1909–10—Rhea-Dione	+ 464±963	− 245±204	+ 495±835	+ 45±127	+203±109	+145±198
Dione-Tethys	+ 276 64	+ 858 200	+ 447 161	− 48 91	+260 71	−442 170
1910–11—Rhea-Dione	+ 62±116	− 359±157	+ 246±125	+ 53±119	− 14±117	+ 78± 65
Dione-Tethys	+ 291 25	− 48 108	+ 74 108	+ 166 89	−202 78	+173 47
1911–12—Rhea-Dione	+ 189± 68	+ 280±109	+ 281± 91	+ 158± 95	− 29± 66	+ 46± 47
Dione-Tethys	+ 244 38	+ 10 77	+ 175 55	+ 98 65	− 18 44	+ 77 41
1912–13—Dione-Tethys	+ 389± 34	+ 276± 54	− 81± 58	− 81± 41	+ 62± 39	+120± 28
1914–15—Rhea-Dione	+ 345± 35	+ 263± 49	− 149± 49	− 134± 41	−125± 40	+ 84± 21
Dione-Tethys	+ 255 30	+ 176 40	− 75 35	− 109 39	+ 70 37	− 9 29

TETHYS

From	$d\epsilon$	$e \sin \pi$	$e \cos \pi$	$d(\gamma \sin \theta)$	$d(\gamma \cos \theta)$	$\left(\frac{da}{a}\right)$
1909–10—Rhea-Tethys	+4061±---	− 7074±---	−4796±---	+3124±---	−364±---	−298±---
Dione-Tethys	− 728 132	+ 1273 234	+ 774 318	+ 64 80	+ 94 98	−442 170
1910–11—Rhea-Tethys	− 173±126	− 135±186	− 195±176	− 465±158	+ 46±115	+262± 59
Dione-Tethys	− 353 100	− 168 150	− 208 138	− 257 117	+390 122	+173 47
1911–12—Rhea-Tethys	− 226±119	+ 45± 94	+ 161±192	− 15± 53	−316± 75	+131± 31
Dione-Tethys	− 184 61	− 96 91	− 66 76	− 121 65	−262 62	+ 77 41
1912–13—Rhea-Tethys	− 105± 47	− 100± 52	− 11± 61	+ 122± 47	−281± 52	+ 65± 22
Dione-Tethys	− 130 49	+ 12 61	− 208 79	+ 95 49	−239 56	+120 28
1914–15—Rhea-Tethys	− 472± 46	+ 230± 67	+ 86± 60	− 55± 49	+196± 67	+ 21± 23
Dione-Tethys	− 410 38	− 16 49	+ 0 43	+ 32 46	+261 50	− 9 29

Solution of Normal Equations and Probable Errors, 12 Unknowns (unit=0.00001)

TITAN

From	$d\epsilon$	de	$d\pi$	$d(\gamma \sin \theta)$	$d(\gamma \cos \theta)$	$\left(\frac{da}{a}\right)$
1909–10—Titan-Rhea	− 23± 11	+ 34± 14	−1009±454	+ 1± 8	+ 27± 8	+ 115± 8
1910–11—Titan-Rhea	+ 3 8	+ 32 14	+ 814 546	− 6 11	+ 39 9	+ 103 11
1911–12—Titan-Rhea	+ 4 14	+ 63 20	− 225 855	− 7 16	+ 28 16	+ 31 16
1913–14—Titan-Rhea	+ 30 9	− 6 12	−1260 421	− 10 11	+ 23 11	+ 16 8
1914–15—Titan-Rhea	+ 43 14	− 16 21	−3167 713	+ 7 16	+ 29 18	+ 15 14
1915–16—Titan-Rhea	+ 58 22	− 11 26	− 435 860	+ 12 23	+ 15 22	+ 30 17

RHEA

From	$d\epsilon$	$e \sin \pi$	$e \cos \pi$	$d(\gamma \sin \theta)$	$d(\gamma \cos \theta)$	$\left(\frac{da}{a}\right)$
1909–10—Titan-Rhea	− 65± 21	+ 83 30	− 109± 32	+ 33± 16	− 34± 21	+ 79± 18
Rhea-Dione	−1351 974	−1922 1264	− 484 666	− 212 200	+ 11 112	− 841 652
Rhea-Tethys	−6059 ---	−8789 ---	−9085 ---	+ 270 ---	−665 ---	+3278 ---
1910–11—Titan-Rhea	− 77± 21	+ 71± 31	− 142± 39	+ 33± 21	− 39± 22	+ 44± 20
Rhea-Dione	+ 165 86	− 98 113	− 83 96	+ 86 79	− 11 90	+ 111 73
Rhea-Tethys	− 82 69	+ 12 109	− 280 170	− 114 74	− 14 68	+ 251 68
1911–12—Titan-Rhea	− 2± 36	+ 42± 59	− 179± 46	+ 55± 36	− 71± 39	− 8± 34
Rhea-Dione	− 48 68	+ 65 112	+ 56 70	− 85 73	− 64 60	− 55 80
Rhea-Tethys	+ 142 52	+ 122 69	+ 14 85	+ 146 45	− 90 35	+ 148 30
1912–13—Rhea-Tethys	+ 31± 26	− 41± 31	− 125± 34	− 51± 29	− 54± 28	+ 67± 25
1913–14—Titan-Rhea	− 60± 20	+ 44± 28	− 21± 27	+ 0± 26	− 61± 24	+ 10± 21
1914–15—Titan-Rhea	+ 27± 35	+ 211± 52	− 2± 45	+ 120± 42	− 73± 38	+ 18± 32
Rhea-Dione	+ 5 28	+ 58 37	− 26 36	+ 79 31	− 60 31	+ 80 25
Rhea-Tethys	− 119 29	+ 166 36	− 77 36	− 18 30	− 19 35	+ 43 25
1915–16—Titan-Rhea	− 64± 45	+ 21± 56	+ 5± 60	− 20± 52	− 45± 53	+ 71± 46

DIONE

1909–10—Rhea-Dione	− 603±1171	−2661±1538	− 274±963	+ 0±130	+106±125	−2167±1472
Dione-Tethys	+ 205 71	+ 638 222	+ 175 204	− 61 89	+168 82	− 51 250
1910–11—Rhea-Dione	+ 74± 119	− 366± 161	+ 216±130	+ 56±121	+ 19±123	− 22± 118
Dione-Tethys	+ 276 74	− 25 102	+ 3 106	+ 144 85	−154 77	+ 7 81
1911–12—Rhea-Dione	+ 204± 68	+ 290± 108	+ 368±106	+ 176± 95	− 82± 73	+ 157± 85
Dione-Tethys	+ 203 43	− 154 113	+ 292 80	+ 109 64	+ 52 56	− 59 81
1912–13—Dione-Tethys	+ 382± 33	+ 267± 52	− 116± 58	− 91± 39	+ 44± 38	+ 166± 34
1914–15—Rhea-Dione	+ 344± 35	+ 266± 50	− 155± 52	− 138± 43	−127± 41	+ 94± 36
Dione-Tethys	+ 259 31	+ 181 40	− 74 35	− 115 40	+ 64 38	+ 2 33

TETHYS

1909–10—Rhea-Tethys	+6235± ---	−7375± ---	−9563±---	+2819±---	+691±---	−6195± ---
Dione-Tethys	− 709 130	+ 977 269	+ 218 409	+ 26 80	+ 61 97	− 326 175
1910–11—Rhea-Tethys	− 119± 175	− 119± 202	− 289±272	− 461±169	− 3±160	+ 394± 279
Dione-Tethys	− 231 106	− 173 142	− 233 131	− 193 114	+333 118	+ 420 109
1911–12—Rhea-Tethys	− 185± 114	+ 186± 102	+ 157±183	+ 9± 51	−251± 75	− 16± 59
Dione-Tethys	− 177 60	− 242 117	+ 89 109	− 104 64	−338 72	+ 190 71
1912–13—Rhea-Tethys	− 105± 48	− 100± 53	− 8± 64	+ 123± 48	−278± 55	+ 58± 41
Dione-Tethys	− 127 48	− 6 60	− 266 80	+ 112 48	−211 55	+ 53 40
1914–15—Rhea-Tethys	− 459± 47	+ 233± 64	+ 82± 60	− 12± 52	+222± 68	− 82± 50
Dione-Tethys	− 415 40	− 13 50	+ 2 43	+ 38 47	+272 51	− 35 41

TETHYS

The results for the pair Rhea-Tethys, 1909–10, are omitted since there were only six observations.

Referring to the summary of corrections to the elements and combining the results for each opposition according to their respective probable errors, there are found the following values of $d\epsilon_3$ after transforming from radians into degrees:

From the solutions for 11 unknowns:

Mean date	Gr. M. T.	$d\epsilon_3$	r	Wt.
		°	°	
1909. 836	Nov. 2. 0	−0. 4171	±0. 0756	6
1910. 797	Oct. 19. 0	−0. 1622	0. 0447	16
1911. 792	Oct. 17. 0	−0. 1106	0. 0309	34
1912. 876	Nov. 16. 0	−0. 0670	0. 0195	87
1914. 986	Dec. 27. 0	−0. 2492	0. 0166	116

From the assumed elements of Tethys and the assumed position of the ring plane were derived for the dates just written observed and computed values of l_1 referred to the mean equinox of each date. l_1 is counted from the mean equinox of date along the ecliptic to the ring plane, on that plane to the ascending node of the satellite's orbit, and then on the orbit plane. Weights were assigned arbitrarily.

Mean date	Observed l_1		Computed l_1		l_1 $(C-O)$	Wt.
	°	′	°	′	′	
1909. 836	91	21. 40	91	46. 43	+25. 03	½
1910. 797	66	28. 50	66	38. 23	+ 9. 73	½
1911. 792	169	46. 42	169	53. 06	+ 6. 64	½
1912. 876	86	6. 10	86	10. 13	+ 4. 03	1
1914. 986	233	52. 96	234	7. 91	+14. 95	1

The weighted mean of the $l_1(C-O)$ is $+11'.34$ for the epoch 1912.593, or August 4.0, Gr. M. T.

The solutions for 12 unknowns give:

Mean date	$d\epsilon_3$	r
	°	°
1909. 836	−0. 4062	±0. 0745
1910. 797	−0. 1151	0. 0519
1911. 792	−0. 1024	0. 0304
1912. 876	−0. 0665	0. 0194
1914. 986	−0. 2484	0. 0175

For $e \sin \pi$, $e \cos \pi$, e, and π the results for the respective mean dates, for 11 unknowns, are:

Mean date	$e \sin \pi$	r	Wt.	$e \cos \pi$	r	Wt.	e	π
								°
1909. 836	+0. 01273	±0. 00234	2	+0. 00774	±0. 00318	1	0. 01490	58. 70
1910. 797	−0. 00154	0. 00117	7	−0. 00203	0. 00109	8	0. 00255	217. 18
1911. 792	−0. 00029	0. 00065	23	−0. 00035	0. 00071	20	0. 00046	219. 64
1912. 876	−0. 00053	0. 00040	64	−0. 00084	0. 00048	43	0. 00099	212. 25
1914. 986	+0. 00069	0. 00040	64	+0. 00029	0. 00035	82	0. 00075	67. 20

The solutions for 12 unknowns give:

Mean date	$e \sin \pi$	r	$e \cos \pi$	r	e	π
						°
1909. 836	+0. 00977	±0. 00269	+0. 00218	±0. 00409	0. 01001	77. 42
1910. 797	−0. 00155	0. 00116	−0. 00244	0. 00118	0. 00289	212. 49
1911. 792	+0. 00001	0. 00077	+0. 00107	0. 00094	0. 00107	0. 64
1912. 876	−0. 00059	0. 00040	−0. 00109	0. 00050	0. 00124	208. 42
1914. 986	+0. 00080	0. 00039	+0. 00029	0. 00035	0. 00085	70. 05

For $d(\gamma \sin \theta)$ and $d(\gamma \cos \theta)$ were found from the solutions for 11 unknowns:

Mean date	$d(\gamma \sin \theta)$	r	Wt.	$d(\gamma \cos \theta)$	r	Wt.	Computed $\gamma \sin \theta$	Computed $\gamma \cos \theta$
	′	′		′	′		′	′
1909. 836	+ 2. 200	±2. 750	16	+3. 232	±3. 369	10	−59. 364	+24. 863
1910. 797	−11. 379	3. 231	11	+7. 150	2. 888	14	−43. 913	−47. 053
1911. 792	− 1. 994	1. 410	59	−9. 764	1. 650	44	+31. 343	−56. 214
1912. 876	+ 3. 747	1. 169	87	−9. 008	1. 306	69	+61. 294	+19. 628
1914. 986	− 0. 309	1. 169	89	+8. 182	1. 375	62	−63. 534	+10. 283

Adding the corrections to the computed values of $\gamma \sin \theta$ and $\gamma \cos \theta$ are obtained:

Mean date	γ	Wt.	θ	$\theta-\omega_1$	Observed Θ	Computed Θ	Θ $(C-O)$	Wt.
	′		° ′	° ′	°	°	°	
1909. 836	63. 694	1	296 10. 40	253 34. 08	61. 805	58. 357	− 3. 448	1
1910. 797	68. 188	1	234 11. 03	191 36. 10	359. 852	348. 691	−11. 161	1
1911. 792	72. 210	1	156 1. 12	113 27. 75	281. 726	276. 565	− 5. 161	2
1912. 876	65. 903	2	80 43. 60	38 12. 18	206. 482	198. 000	− 8. 482	2
1914. 896	66. 459	2	286 7. 87	243 40. 62	51. 986	45. 049	− 6. 937	2

ω_1 is the angle from the equator to the ecliptic measured on the ring plane. Weights were assigned arbitrarily to γ and to Θ $(C-O)$. The weighted mean for γ is 66′.974 for 1912.593, or August 4.0, Gr. M. T.

1757—29——21

Evidently the assumed motion of Θ should be decreased. If weights are assigned as indicated Θ may be written

$$\Theta = 110^\circ.55 - 72^\circ.2 \times t,$$

for the mean equinox and ecliptic of 1889.250 Gr. M. T. and equator of Saturn.

The solutions for 12 unknowns give:

Mean date	$d(\gamma \sin \theta)$	r	$d(\gamma \cos \theta)$	r	γ	Wt.	θ
	′	′	′	′	′		°
1909. 836	+0. 894	±2. 751	+ 2. 097	±3. 335	64. 386	1	294. 754
1910. 797	−9. 517	3. 249	+ 7. 379	3. 265	66. 549	1	233. 405
1911. 792	−1. 200	1. 371	−10. 186	1. 786	72. 922	1	155. 583
1912. 876	+4. 040	1. 167	− 8. 406	1. 337	66. 290	2	80. 254
1914. 986	+0. 534	1. 199	+ 8. 734	1. 403	65. 807	2	286. 797

The weights assigned to γ are arbitrary. The weighted mean is $\gamma = 66'.864$.

In the *Abhandlungen der Königl. Preuss. Akademie der Wissenschaften, Jahrgang 1918, Phys.-Math. Klasse, Nr. 1, Seiten 121–123,* Dr. Georg Struve has discussed the results of the observations of Tethys for the determination of corrections to ϵ_1, the longitude at epoch; to n_1, the tropical mean daily motion; and to A_1, the amplitude of the principal term of libration.

The observation equation has the form:

$$dl_1 = d\epsilon_1 + (t - t_o)\, dn_1 + \sin \mu\ (\tau - \tau_o) dA_1.$$

τ_o is the epoch of vanishing of the libration angle.

Adding to the observation equations of Dr. Struve the results for l_1 obtained from the five oppositions observed at Washington, as already written for 11 unknowns, and solving with the additional equations, are found:

$$\begin{aligned} d\epsilon_1 &= -3'.14 \pm 1'.02 \\ dn_1 &= -0^\circ.000003 \pm 0^\circ.000004 \\ dA_1 &= +0^\circ.1157 \pm 0^\circ.0265 \end{aligned}$$

The opposition of 1909 observed at Washington was given half weight.

For the determination of the position of the ring plane from the orbit of Tethys Dr. H. Struve has written observation equations in the form:

$$\sin i_1 (\Omega_o - \Omega_c) = \sin i_1 d\Omega_1 + \cos (\theta - \omega_1) \gamma d\theta_o + \sin (\theta - \omega_1) d\gamma + \cos (\theta - \omega_1)(\tau - 1889.25) \gamma d(\Delta\theta)$$
$$i_o - i_c = di_1 - \sin (\theta - \omega_1) \gamma d\theta_o + \cos (\theta - \omega_1) d\gamma - \sin (\theta - \omega_1)(\tau - 1889.25) \gamma d(\Delta\theta)$$

Ω_c and i_c were computed from the assumed orbit of Tethys and from the assumed position of the ring plane—that is, from:

$$\gamma = 64'.33,\ \theta_0 - \omega_1 = 302^\circ.60 \text{ for } 1889.25$$
$$\theta = \theta_0 - 72^\circ.5\ (\tau - 1889.25)$$
$$\left.\begin{aligned} \Omega_1 &= 167^\circ\ 57'.0 \\ i_1 &= \ \ 28\ \ \ \ 5\ .6 \end{aligned}\right\} \text{for } 1889.25$$

Ω_o and i_o were computed from the observed values of θ obtained from 11 unknowns, from the mean of the observed values of $\gamma = 66'.974$, and from the assumed values of Ω_1 and i_1.

The observation equations were solved only for the oppositions observed at Washington. Evidently, on account of the small number of equations, some of the unknown quantities have small weights.

The results for the unknown quantities are:

$$\begin{aligned}
\sin i_1 d\Omega_1 &= +0'.038 \pm 0'.83\\
10\,\gamma d(\Delta\theta) &= +2.78 \pm 4.84\\
di_1 &= -0.16 \pm 0.84\\
\gamma d\theta_0 &= +1.66 \pm 11.54\\
d\gamma &= +2.04 \pm 0.83\\
d\Omega_1 &= +0.08 \pm 1.76\\
d\theta_0 &= +1^\circ.481 \pm 10^\circ.278\\
d(\Delta\theta) &= +0.247 \pm 0.431
\end{aligned}$$

The probable error of one equation is $\pm 1'.63$.

DIONE

The assumed orbit was taken as circular. Referring to the summary of corrections resulting from the solutions of the observation equations for 11 unknowns and combining the results for each opposition according to their respective probable errors, values of $d\epsilon_4$ and l_1 are found for the mean dates as shown below, after transforming from radians.

Mean date	Gr. M. T.	$d\epsilon_4$	r	Wt.	Observed l_1	Computed l_1	l_1 $(C-O)$
		°	°		° ′	° ′	′
1909. 831	Nov. 0. 0	+0. 1587	±0. 0367	25	213 50. 94	213 41. 42	− 9. 52
1910. 800	Oct. 20. 0	+0. 1610	0. 0138	167	337 12. 04	337 2. 37	− 9. 67
1911. 805	Oct. 22. 0	+0. 1323	0. 0189	91	10 27. 30	10 19. 36	− 7. 94
1912. 878	Nov. 17. 0	+0. 2228	0. 0195	86	92 14. 71	92 1. 34	−13. 37
1914. 986	Dec. 27. 0	+0. 1679	0. 0132	193	214 6. 16	213 56. 08	−10. 08

l_1 is referred to the mean equinox of date. The arithmetical mean of the l_1 $(C-O)$ is $-10'.12$ for the mean date 1912.060, or, 1912, Jan. 23.0, Gr. M. T.

The solutions of the observation equations for 12 unknowns give:

Mean date	$d\epsilon_4$	r
	°	°
1909. 831	+0. 1158	±0. 0406
1910. 800	+0. 1258	0. 0360
1911. 805	+0. 1165	0. 0208
1912. 878	+0. 2189	0. 0189
1914. 986	+0. 1698	0. 0133

For $e \sin \pi$, $e \cos \pi$, e, and π are obtained from the solutions for 11 unknowns:

Mean date	$e \sin \pi$	r	Wt.	$e \cos \pi$	r	Wt.	e	Obs. π	Wt.	Comp. π	π $(C-O)$
								°		°	°
1909.831	+0.00317	±0.00143	5	+0.00449	±0.00158	4	0.00550	35.23	1	83.01	+ 47.78
1910.800	−0.00148	0.00089	13	+0.00148	0.00082	15	0.00209	315.00	1	113.05	+158.05
1911.805	+0.00100	0.00063	25	+0.00203	0.00047	45	0.00226	26.22	2	144.20	+117.98
1912.878	+0.00276	0.00054	34	−0.00081	0.00058	30	0.00288	106.36	2	177.47	+ 71.11
1914.986	+0.00211	0.00031	104	−0.00100	0.00028	123	0.00234	115.36	4	242.82	+127.46

Arbitrary weights were given to the π observed. The computed π were found from $\pi = 165° + 31°.0 \times t$.

The orbit of Dione seems to have an eccentricity.

The solutions of the observation equations for 12 unknowns give:

Mean date	$e \sin \pi$	r	$e \cos \pi$	r	e	π
						°
1909. 831	+0. 00570	±0. 00220	+0. 00156	±0. 00200	0. 00591	74. 74
1910. 800	−0. 00123	0. 00086	+0. 00088	0. 00082	0. 00151	305. 68
1911. 805	+0. 00078	0. 00078	+0. 00320	0. 00064	0. 00329	13. 72
1912. 878	+0. 00267	0. 00052	−0. 00116	0. 00058	0. 00291	113. 49
1914. 986	+0. 00214	0. 00031	−0. 00099	0. 00029	0. 00236	114. 87

For $d(\gamma \sin \theta)$, $d(\gamma \cos \theta)$, and for the computed values of $\gamma \sin \theta$ and $\gamma \cos \theta$, the results for 11 unknowns are:

Mean date	$d(\gamma \sin \theta)$	r	Wt.	$d(\gamma \cos \theta)$	r	Wt.	Computed $\gamma \sin \theta$	Computed $\gamma \cos \theta$
	′	′		′	′		′	′
1909. 831	−0. 584	±2. 544	18	+8. 388	±2. 063	28	−3. 180	−2. 427
1910. 800	+4. 332	2. 441	20	−4. 950	2. 234	24	−1. 536	−3. 693
1911. 805	+4. 022	1. 856	35	−0. 722	1. 272	75	+0. 598	−3. 955
1912. 878	−2. 785	1. 410	59	+2. 132	1. 341	66	+2. 671	−2. 978
1914. 986	−4. 160	0. 963	125	−0. 688	0. 928	136	+3. 819	+1. 190

After applying to $\gamma \sin \theta$ and $\gamma \cos \theta$ as computed the corrections given by the observation equations γ and Θ are found to be:

Mean date	Observed γ	Wt.	Observed θ	Observed $\theta - \omega_1$	Observed Θ	Computed Θ
	′		°	°	°	°
1909. 831	7. 05	1	327. 730	285. 124	93. 361	358. 276
1910. 800	9. 08	1	162. 073	119. 491	287. 741	328. 251
1911. 805	6. 57	2	135. 351	92. 796	261. 060	297. 110
1912. 878	8. 54	2	187. 674	145. 150	313. 429	263. 862
1914. 986	6. 07	4	325. 812	283. 358	91. 667	198. 543

Weights were assigned arbitrarily to γ. The weighted mean for γ is $7'.06$.

Apparently a comparison of these observed and computed values of Θ does not furnish a determinate result for the motion of Θ.

The solutions of the observation equations for 12 unknowns give:

Mean date	$d(\gamma \sin \theta)$	r	$d(\gamma \cos \theta)$	r	Observed γ	Observed θ
	′	′	′	′	′	°
1909. 831	−1. 428	±2. 524	+5. 134	±2. 357	5. 34	300. 43
1910. 800	+3. 951	2. 391	−3. 620	2. 244	7. 70	161. 73
1911. 805	+4. 467	1. 825	+0. 081	1. 528	6. 38	127. 41
1912. 878	−3. 128	1. 341	+1. 513	1. 306	1. 53	197. 33
1914. 986	−4. 320	1. 007	−0. 834	0. 958	0. 61	305. 40

RHEA

For comparison with observations the orbit of Rhea was taken as circular. Combining according to their probable errors, the results for the respective oppositions, the solutions for 11 unknowns give:

Mean date	Gr. M. T.	$d\epsilon_5$	r	Wt.
		°	°	
1909. 853	Nov. 8. 0	−0. 0309	±0. 0120	23
1910. 803	Oct. 21. 0	−0. 0384	0. 0115	25
1911. 846	Nov. 6. 0	+0. 0218	0. 0138	17
1912. 873	Nov. 15. 0	+0. 0183	0. 0143	16
1913. 968	Dec. 20. 0	−0. 0338	0. 0115	25
1914. 997	Dec. 31. 0	−0. 0212	0. 0097	34
1915. 989	Dec. 28. 0	−0. 0384	0. 0252	5

Making use of the assumed elements of Rhea and taking $e=0$ were obtained observed and computed values of l:

Mean date	Observed l	Computed l	l $(C-O)$
	° ′	° ′	′
1909. 853	346 0. 867	346 2. 720	+1. 853
1910. 803	278 28. 607	278 30. 910	+2. 303
1911. 846	40 28. 120	40 26. 812	−1. 308
1912. 873	44 15. 230	44 14. 132	−1. 098
1913. 968	250 14. 408	240 16. 437	+2. 028
1914. 997	323 43. 567	323 44. 838	+1. 272
1915. 989	11 31. 108	11 33. 412	+2. 303

Therefore the tropical mean daily motion, or the assumed value of E_0, requires a small correction.

The solutions for 12 unknowns give:

Mean date	$d\epsilon_5$	r
	°	°
1909. 853	−0. 0376	±0. 0120
1910. 803	−0. 0372	0. 0112
1911. 846	+0. 0171	0. 0156
1912. 873	+0. 0178	0. 0149
1913. 968	−0. 0344	0. 0115
1914. 997	−0. 0197	0. 0100
1915. 989	−0. 0367	0. 0258

For $e \sin \pi$, $e \cos \pi$, e, and π the results for 11 unknowns are:

Mean date	$e \sin \pi$	r	Wt.	$e \cos \pi$	r	Wt.	Observed e	Observed π	Computed π
								°	°
1909. 853	+0. 00098	±0. 00029	12	−0. 00116	±0. 00032	10	0. 00152	139. 81	153. 09
1910. 803	+0. 00051	0. 00029	12	−0. 00138	0. 00034	9	0. 00147	159. 72	162. 68
1911. 846	+0. 00049	0. 00041	6	−0. 00098	0. 00034	9	0. 00110	153. 43	173. 22
1912. 873	−0. 00041	0. 00030	11	−0. 00127	0. 00032	10	0. 00133	197. 89	183. 59
1913. 968	+0. 00044	0. 00028	13	−0. 00021	0. 00027	14	0. 00049	115. 51	194. 65
1914. 997	+0. 00130	0. 00023	19	−0. 00038	0. 00022	22	0. 00135	106. 30	205. 04
1915. 989	+0. 00014	0. 00055	3	+0. 00006	0. 00060	3	0. 00015	66. 80	215. 06

The solutions of the observation equations for 12 unknowns give:

Mean date	$e \sin \pi$	r	$e \cos \pi$	r	Observed e	Observed π	Computed π
						°	°
1909. 853	+0. 00082	±0. 00030	−0. 00110	±0. 00032	0. 00137	143. 30	153. 09
1910. 803	+0. 00056	0. 00029	−0. 00140	0. 00035	0. 00151	158. 24	162. 68
1911. 846	+0. 00074	0. 00042	−0. 00087	0. 00035	0. 00115	139. 62	173. 22
1912. 873	−0. 00041	0. 00031	−0. 00125	0. 00034	0. 00132	198. 16	183. 59
1913. 968	+0. 00044	0. 00028	−0. 00021	0. 00085	0. 00049	115. 51	194. 65
1914. 997	+0. 00133	0. 00023	−0. 00040	0. 00022	0. 00138	106. 57	205. 04
1915. 989	+0. 00021	0. 00056	+0. 00005	0. 00060	0. 00022	76. 61	215. 06

For the respective oppositions are found for $d(\gamma \sin \theta)$ and $d(\gamma \cos \theta)$ from the solutions for 11 unknowns:

Mean date	$d(\gamma \sin \theta)$	r	Wt.	$d(\gamma \cos \theta)$	r	Wt.
	′	′		′	′	
1909. 853	+1. 306	±0. 550	41	−1. 306	±0. 722	24
1910. 803	+0. 825	0. 688	24	−1. 650	0. 688	25
1911. 846	+2. 166	0. 928	14	−3. 094	0. 825	18
1912. 873	−1. 719	0. 963	13	−1. 856	0. 928	14
1913. 968	−0. 034	0. 859	16	−2. 166	0. 756	21
1914. 997	+1. 754	0. 653	29	−1. 650	0. 688	25
1915. 989	−0. 172	1. 650	4	−1. 306	1. 788	4

After applying to the computed quantities the corrections $d(\gamma \sin \theta)$ and $d(\gamma \cos \theta)$ there are found for the respective oppositions:

Mean date	Observed γ	Computed γ	γ $(C-O)$	Observed θ	Computed θ	θ $(C-O)$
	′	′	′	° ′	° ′	° ′
1909. 853	22. 668	21. 441	−1. 228	181 34. 720	185 9. 945	+3 35. 226
1910. 803	22. 937	21. 226	−1. 711	174 31. 117	176 18. 622	+1 47. 505
1911. 846	24. 508	20. 954	−3. 554	163 13. 108	166 26. 878	+3 13. 771
1912. 873	21. 796	20. 652	−1. 144	162 41. 615	156 35. 822	−6 5. 793
1913. 968	22. 119	20. 309	−1. 810	149 9. 493	145 56. 489	−3 13. 004
1914. 997	22. 375	19. 969	−2. 406	135 27. 556	135 43. 532	+0 15. 976
1915. 989	20. 292	19. 636	−0. 656	128 59. 996	125 43. 250	−3 16. 746

The solutions of the observation equations for 12 unknowns give:

Mean date	$d(\gamma \sin \theta)$	r	Observed $\gamma \sin \theta$	$d(\gamma \cos \theta)$	r	Observed $\gamma \cos \theta$
	′	′	′	′	′	′
1909. 853	+1. 081	±0. 548	− 0. 850	−1. 116	±0. 710	−22. 470
1910. 803	+0. 893	0. 673	+ 2. 259	−1. 214	0. 701	−22. 396
1911. 846	+2. 333	0. 902	+ 7. 243	−2. 707	0. 821	−23. 078
1912. 873	−1. 754	0. 997	+ 6. 449	−1. 856	0. 963	−20. 809
1913. 968	0. 000	0. 894	+11. 374	−2. 097	0. 825	−18. 922
1914. 997	+1. 647	0. 659	+15. 587	−1. 733	0. 681	−16. 031
1915. 989	−0. 688	1. 788	+15. 254	−1. 547	1. 822	−13. 011

Mean date	Observed γ	Computed γ	γ $(C-O)$	Observed θ	Computed θ	θ $(C-O)$
	′	′	′	°	°	°
1909. 853	22. 486	21. 441	−1. 045	182. 166	185. 166	+3. 000
1910. 803	22. 509	21. 226	−1. 283	174. 240	176. 310	+2. 070
1911. 846	24. 188	20. 954	−3. 234	162. 576	166. 448	+3. 872
1912. 873	21. 786	20. 652	−1. 134	162. 781	156. 597	−6. 184
1913. 968	22. 078	20. 309	−1. 769	148. 991	145. 941	−3. 050
1914. 997	22. 359	19. 969	−2. 390	135. 804	135. 726	−0. 078
1915. 989	20. 050	19. 636	−0. 414	130. 463	125. 721	−4. 742

With the assumed values of Ω_1 and i_1 and the observed values of γ and θ found from the solutions for 11 unknowns are obtained the following results for Ω and i, referred to the mean equinox and ecliptic of date:

Mean date	Observed Ω	Computed Ω	Ω $(C-O)$	Observed i	Computed i	i $(C-O)$
	° ′	° ′	′	° ′	° ′	′
1909. 853	168 46. 119	168 42. 161	−3. 958	27 48. 405	27 48. 468	+0. 062
1910. 803	168 51. 562	168 47. 858	−3. 703	27 50. 180	27 50. 827	+0. 647
1911. 846	168 60. 966	168 53. 064	−7. 902	27 53. 046	27 53. 822	+0. 776
1912. 873	168 57. 009	168 56. 981	−0. 028	27 54. 558	27 57. 086	+2. 528
1913. 968	168 62. 832	168 59. 730	−3. 102	27 59. 190	28 0. 792	+1. 602
1914. 997	168 66. 014	168 60. 897	−5. 118	28 4. 360	28 4. 368	+0. 008
1915. 989	168 62. 346	168 60. 722	−1. 624	28 6. 719	28 7. 787	+1. 068

Considering di_1, $\sin i_1\, d\Omega_1$, $c \sin b$, and $c \cos b$ as unknowns, a least square solution was made to determine them from the quantities $(\Omega-\Omega_1) \sin i_1$ and $i-i_1$. From Ω as resulting from the solutions for 11 unknowns was subtracted

$$-0'.38+1'.00 \sin (48^\circ.5-0^\circ.50\times t).$$

From i as resulting from the solutions for 11 unknowns was subtracted

$$-2'.79+1'.00 \cos (48^\circ.5-0^\circ.50\times t).$$

Ω and Ω_1 were taken for the equinox 1889.25.

As written by Dr. G. Struve in *Nr. 4880, S. 136, of the Astronomische Nachrichten,* the observation equations are:

$$(\Omega-\Omega_1) \sin i_1=\sin i_1 d\Omega_1+c \sin b \cos \beta nt-c \cos b \sin \beta nt$$
$$i-i_1=di_1 \qquad +c \sin b \sin \beta nt+c \cos b \cos \beta nt$$

The value βn of the assumed elements was retained; that is, $\beta n=10^\circ.1$.

For the unknowns were found:

$$di_1=-1'.57 \qquad \sin i_1 d\Omega_1=+2'.16 \qquad c \sin b=-4'.66 \qquad c \cos b=+18'.54$$

Each observation equation was given the weight 1. The probable error of an equation is $\pm 0'.76$, and the probable error of each unknown is $\pm 0'.80$.

For the unknowns were obtained:

$$d\Omega_1=+4'.58 \qquad b=345^\circ\ 53'.8 \qquad c=+19'.12$$

The assumed elements give $b=347^\circ.3$ and $c=+19'.77$.

TITAN

From the solutions of the observation equations for 11 unknowns were found corrections $d\epsilon_6$ as follows:

Mean date	Gr. M. T.	$d\epsilon_6$	r	Wt.
		°	°	
1909. 858	Nov. 10. 0	−0. 0119	±0. 0064	8
1910. 814	Oct. 25. 0	+0. 0011	0. 0044	16
1911. 876	Nov. 17. 0	+0. 0039	0. 0081	5
1913. 968	Dec. 20. 0	+0. 0172	0. 0053	12
1915. 017	Jan. 7. 0	+0. 0242	0. 0075	6
1915. 989	Dec. 28. 0	+0. 0350	0. 0119	2

The arithmetical mean of the $d\epsilon_6$ is $+0°.0117$, or $42''$, for 1912.920.

From the assumed elements of Titan and the assumed position of the ring plane there were found for the mean dates:

Mean date	Observed l	Computed l
	° ′	° ′
1909. 858	211 29. 883	211 30. 600
1910. 814	170 53. 100	170 53. 033
1911. 876	290 45. 950	290 45. 717
1913. 968	259 36. 867	259 35. 833
1915. 017	266 36. 983	266 35. 533
1915. 989	1 27. 917	1 25. 817

The solutions for 12 unknowns give:

Mean date	$d\epsilon_6$	r
	°	°
1909. 858	−0. 0132	±0. 0063
1910. 814	+0. 0017	0. 0046
1911. 876	+0. 0023	0. 0080
1913. 968	+0. 0172	0. 0052
1915. 017	+0. 0246	0. 0080
1915. 989	+0. 0332	0. 0126

The following results were found for e, the eccentricity, from the solutions for 11 unknowns:

Mean date	de	r	Wt.	Computed e	Observed e	Red. to 1890.0	1890.0 e observed
1909. 858	+0. 00039	±0. 00014	5	0. 02875	0. 02914	+0. 00011	0. 02925
1910. 814	+0. 00032	0. 00015	4	0. 02876	0. 02908	+0. 00010	0. 02918
1911. 876	+0. 00058	0. 00020	3	0. 02879	0. 02937	+0. 00007	0. 02944
1913. 968	−0. 00007	0. 00012	7	0. 02885	0. 02878	+0. 00001	0. 02879
1915. 017	−0. 00017	0. 00021	2	0. 02887	0. 02870	−0. 00001	0. 02869
1915. 989	−0. 00013	0. 00026	1	0. 02888	0. 02875	−0. 00002	0. 02873

The reduction to 1890.0 was made with the assumed data of the elements. The arithmetical mean of the observed e for 1890.0 is 0.02887.

For 12 unknowns the solutions of the observation equations give:

Mean date	de	r	Computed e	Observed e	Red. to 1890.0	1890.0 e observed
1909. 858	+0. 00034	±0. 00014	0. 02875	0. 02909	+0. 00011	0. 02920
1910. 814	+0. 00032	0. 00014	0. 02876	0. 02908	+0. 00010	0. 02918
1911. 876	+0. 00063	0. 00020	0. 02879	0. 02942	+0. 00007	0. 02949
1913. 968	−0. 00006	0. 00012	0. 02885	0. 02879	+0. 00001	0. 02880
1915. 017	−0. 00016	0. 00021	0. 02887	0. 02871	−0. 00001	0. 02870
1915. 989	−0. 00011	0. 00026	0. 02888	0. 02877	−0. 00002	0. 02875

For π, the longitude of the perisaturnium, were obtained from the solutions for 11 unknowns:

Mean date	$d\pi$	r	Wt.	Computed π	Observed π	1890.0 π observed
	°	°		°	°	°
1909. 858	−0. 412	±0. 243	6	286. 580	286. 169	275. 838
1910. 814	+0. 550	0. 319	3	287. 029	287. 580	276. 801
1911. 876	−0. 022	0. 481	1	287. 548	287. 526	276. 228
1913. 968	−0. 720	0. 240	6	288. 653	287. 933	275. 530
1915. 017	−1. 817	0. 407	2	289. 246	287. 430	274. 433
1915. 989	−0. 202	0. 485	1	289. 812	289. 610	276. 048

π is counted on the ecliptic and orbit of Titan. The arithmetical mean of π observed for 1890.0 is 275°.813.

The solutions of the observation equations for 12 unknowns give:

Mean date	$d\pi$	r	Computed π	Observed π	Red. to 1890.0	1890.0 π observed
	°	°	°	°	°	°
1909. 858	−0. 578	±0. 260	286. 580	286. 002	−10. 330	275. 672
1910. 814	+0. 466	0. 313	287. 029	287. 495	−10. 779	276. 716
1911. 876	−0. 129	0. 490	287. 548	287. 419	−11. 298	276. 121
1913. 968	−0. 722	0. 241	288. 653	287. 931	−12. 403	275. 528
1915. 017	−1. 814	0. 408	289. 246	287. 432	−12. 996	274. 436
1915. 989	−0. 249	0. 493	289. 812	289. 563	−13. 562	276. 001

For $d(\gamma \sin \theta)$, $d(\gamma \cos \theta)$, γ, θ, Ω, and i were found from the solutions for 11 unknowns:

Mean date	$d(\gamma \sin \theta)$	r	Wt.	Computed $\gamma \sin \theta$	$d(\gamma \cos \theta)$	r	Wt.	Comp. $\gamma \cos \theta$
	′	′		′	′	′		′
1909. 858	0. 000	±0. 275	16	−10. 070	+1. 031	±0. 275	16	−22. 832
1910. 814	−0. 172	0. 378	8	−10. 303	+1. 478	0. 309	12	−22. 976
1911. 876	−0. 206	0. 550	4	−10. 663	+1. 031	0. 550	4	−23. 006
1913. 968	−0. 344	0. 344	10	−11. 434	+0. 825	0. 344	10	−22. 566
1915. 017	+0. 275	0. 550	4	−11. 696	+1. 031	0. 619	3	−22. 124
1915. 989	+0. 344	0. 791	2	−11. 813	+0. 447	0. 722	2	−21. 647

Mean date	Observed $\gamma \sin \theta$	Observed $\gamma \cos \theta$	Observed θ	Computed θ	θ $(C-O)$
	′	′	° ′	° ′	′
1909. 858	−10. 070	−21. 801	204 47. 600	203 48. 017	− 59. 583
1910. 814	−10. 475	−21. 498	205 58. 700	204 9. 183	−109. 517
1911. 876	−10. 869	−21. 975	206 19. 100	204 52. 083	− 87. 017
1913. 968	−11. 778	−21. 741	208 26. 733	206 52. 217	− 94. 517
1915. 017	−11. 421	−21. 093	208 26. 167	207 51. 817	− 34. 350
1915. 989	−11. 469	−21. 200	208 24. 800	208 37. 333	+ 12. 533

The arithmetical mean of the θ $(C-O)$ is $-62'.075$ for 1912.920.

Mean date	Observed γ	Computed γ	γ $(C-O)$	Mean Equinox of date Ω observed	Equinox 1890.0 Ω observed
	′	′	′	° ′	° ′
1909. 858	24. 015	24. 954	+0. 940	168 30. 029	168 13. 424
1910. 814	23. 915	25. 181	+1. 266	168 29. 726	168 12. 322
1911. 876	24. 516	25. 357	+0. 841	168 30. 663	168 12. 371
1913. 968	24. 726	25. 297	+0. 571	168 30. 577	168 10. 536
1915. 017	23. 985	25. 026	+1. 040	168 31. 042	168 10. 124
1915. 989	24. 104	24. 661	+0. 557	168 31. 907	168 10. 176

Subtracting the periodic terms from the values of Ω for 1890.0 there result:

1890.0 Ω observed
° ′
167 49. 686
167 48. 764
167 49. 371
167 49. 448
167 50. 130
167 51. 089

The arithmetical mean of the values of γ $(C-O)$ is $+0'.869$. The arithmetical mean of the observed Ω for 1890.0, freed from periodic terms, is $167° 49'.748$, corresponding to $167° 51'.2$ derived from the assumed elements.

The observed values of i follow, for the mean equinox of date and for 1890.0, as well as the values found after the periodic terms have been subtracted:

Mean date	Observed i	1890.0 i observed	1890.0 Freed from periodic terms, i observed
	° ′	° ′	° ′
1909. 858	27 42. 590	27 42. 745	27 29. 15
1910. 814	27 42. 529	27 42. 692	27 29. 37
1911. 876	27 41. 898	27 42. 069	27 29. 01
1913. 968	27 41. 432	27 41. 620	27 28. 78
1915. 017	27 42. 141	27 42. 336	27 29. 35
1915. 989	27 42. 017	27 42. 220	27 28. 96

The arithmetical mean of the observed i, for 1890.0, freed from the periodic terms, is 27° 29′.10, corresponding to 27° 28′.4 derived from the assumed elements.

The solutions for 12 unknowns give:

Mean date	$d(\gamma \sin \theta)$	r	Computed $\gamma \sin \theta$	$d(\gamma \cos \theta)$	r	Computed $\gamma \cos \theta$
	′	′	′	′	′	′
1909. 858	+0. 0344	±0. 2751	−10. 0705	+0. 9284	±0. 2751	−22. 8324
1910. 814	−0. 2063	0. 3782	−10. 3034	+1. 3410	0. 3094	−22. 9764
1911. 876	−0. 2407	0. 5500	−10. 6634	+0. 9628	0. 5500	−23. 0059
1913. 968	−0. 3438	0. 3782	−11. 4337	+0. 7906	0. 3782	−22. 5660
1915. 017	+0. 2407	0. 5500	−11. 6961	+0. 9970	0. 6188	−22. 1241
1915. 989	+0. 4126	0. 7906	−11. 8132	+0. 5157	0. 7563	−21. 6470

Observed θ	Computed θ	θ $(C-O)$	Observed γ	Computed γ	γ $(C-O)$
°	°	°	′	′	′
204. 617	203. 800	−0. 817	24. 093	24. 954	+0. 861
205. 909	204. 153	−1. 756	24. 053	25. 181	+1. 128
206. 320	204. 868	−1. 452	24. 592	25. 357	+0. 765
208. 407	206. 870	−1. 537	24. 756	25. 297	+0. 541
208. 467	207. 864	−0. 603	24. 033	25. 026	+0. 993
208. 348	208. 622	+0. 274	24. 011	24. 661	+0. 650

MASS OF SATURN

The assumed semiaxes major of the satellites' orbits correspond to the reciprocal of the mass of Saturn's system $\mu_0 = 3500$. The assumed semiaxes major are: Tethys, 42″.586; Dione, 54″.543; Rhea, 76″.170; Titan, 176″.578. See *Publications de Poulkovo,* Série II, Volume XI, page 239.

The correction $d\mu$ to be added to the assumed value of the reciprocal of the mass μ_0 is found from the relation $\frac{d\mu}{\mu_0} = -3\frac{da}{a}$, which satisfies KEPLER's Third Law.

From measures of the pair Dione-Tethys were obtained for 11 unknowns:

Dione-Tethys

Opposition	Obsr.	$\frac{da}{a}$	r	$d\mu_0$	μ	r	Wt.
1909–10	Hall	−0. 00442	±0. 00170	+46. 4	3546. 4	±17. 8	3
1910–11	Hall	+0. 00173	0. 00047	−18. 2	3481. 8	4. 9	42
1911–12	Burton	+0. 00077	0. 00041	− 8. 1	3491. 9	4. 3	54
1912–13	Burton	+0. 00120	0. 00028	−12. 6	3487. 4	2. 9	119
1914–15	Hall	−0. 00009	0. 00029	+ 0. 9	3500. 9	3. 0	111

The weighted mean of μ is: $\mu=3492.5\pm1.7$.

From the combinations of Rhea with Dione and Tethys the solutions for 11 unknowns give:

Opposition	Obsr.	$\frac{da}{a}$	r	$d\mu_0$	μ	r	Wt.
1909–10. Rhea-Dione	Hall.	+0. 00145	±0. 00198	−15. 2	3484. 8	±20. 8	2
1910–11. Rhea-Dione	Hall.	+0. 00078	0. 00065	− 8. 2	3491. 8	6. 8	22
1910–11. Rhea-Tethys	Hall.	+0. 00262	0. 00059	−27. 5	3472. 5	6. 2	26
1911–12. Rhea-Dione	Hall.	+0. 00046	0. 00047	− 4. 8	3495. 2	4. 9	42
1911–12. Rhea-Tethys	Burton.	+0. 00131	0. 00031	−13. 8	3486. 2	3. 3	92
1912–13. Rhea-Tethys	Burton.	+0. 00065	0. 00022	− 6. 8	3493. 2	2. 3	189
1914–15. Rhea-Dione	Hall.	+0. 00084	0. 00021	− 8. 8	3491. 2	2. 2	208
1914–15. Rhea-Tethys	Hall.	+0. 00021	0. 00023	− 2. 2	3497. 8	2. 4	172

The weighted mean of μ is: $\mu=3492.2\pm1.15$. The pair Titan-Rhea was observed by HALL and EPPES in 1909–10. The observations of the other oppositions were by HALL.

From the solutions for 11 unknowns are found:

Titan-Rhea

Opposition	$\frac{da}{a}$	r	$d\mu_0$	μ	r	Wt.
1909–10	+0. 00108	±0. 00007	−11. 3	3488. 7	±0. 7	20
1910–11	+0. 00092	0. 00011	− 9. 7	3490. 3	1. 2	7
1911–12	+0. 00026	0. 00015	− 2. 7	3497. 3	1. 6	4
1913–14	+0. 00015	0. 00008	− 1. 6	3498. 4	0. 8	17
1914–15	+0. 00015	0. 00014	− 1. 6	3498. 4	1. 5	5
1915–16	+0. 00036	0. 00015	− 3. 8	3496. 2	1. 6	4

The weighted mean of μ is: $\mu=3493.8\pm0.4$.

For 12 unknowns the solutions give for Tethys:

Mean date	$\frac{da}{a}$	r
1909. 836	−0. 00326	±0. 00175
1910. 797	+0. 00416	0. 00102
1911. 792	+0. 00068	0. 00045
1912. 876	+0. 00055	0. 00029
1914. 986	−0. 00054	0. 00032

Uniting these results according to their probable errors, the correction, $d\mu_0$, to the assumed reciprocal of the mass is: $d\mu_0 = -2.85 \pm 1.97$.

For 12 unknowns the solutions for Dione give:

Mean date	$\frac{da}{a}$	r
1909. 831	−0. 00110	±0. 00246
1910. 800	−0. 00002	0. 00067
1911. 805	+0. 00044	0. 00059
1912. 878	+0. 00166	0. 00034
1914. 986	+0. 00044	0. 00024

Uniting these results according to their probable errors, the correction, $d\mu_0$, to the assumed reciprocal of the mass is: $d\mu_0 = -7.77 \pm 1.89$.

For 12 unknowns the solutions of the observation equations give for Rhea:

Mean date	$\frac{da}{a}$	r
1909. 853	+0. 00078	±0. 00018
1910. 803	+0. 00064	0. 00019
1911. 846	+0. 00070	0. 00022
1912. 873	+0. 00067	0. 00025
1913. 968	+0. 00010	0. 00021
1914. 997	+0. 00051	0. 00015
1915. 989	+0. 00071	0. 00046

Uniting these results according to their probable errors, the correction, $d\mu_0$, to the assumed reciprocal of the mass is: $d\mu_0 = -6.02 \pm 0.81$.

For 12 unknowns the solutions of the observation equations give for Titan:

Mean date	$\frac{da}{a}$	r
1909. 858	+0. 00115	±0. 00008
1910. 814	+0. 00103	0. 00011
1911. 876	+0. 00031	0. 00016
1913. 968	+0. 00016	0. 00008
1915. 017	+0. 00015	0. 00014
1915. 989	+0. 00030	0. 00017

Uniting these results according to their probable errors, the correction, $d\mu_o$, to the assumed reciprocal of the mass is $d\mu_o = -6.46 \pm 0.46$.

In all cases μ_o, the reciprocal of the mass of Saturn, has been taken as 3500.

Miss E. A. Lamson checked the computations made to form from the assumed elements of the satellites quantities to be compared with the observed results derived from the solutions of the observation equations.

OBSERVATIONS OF THE SATELLITES OF URANUS WITH CORRECTIONS TO ELEMENTS OF THE ORBITS OF OBERON AND TITANIA FROM OBSERVATIONS IN 1911

OBSERVATIONS OF THE SATELLITES OF URANUS, WITH CORRECTIONS TO ELEMENTS OF THE ORBITS OF OBERON AND TITANIA FROM OBSERVATIONS IN 1911 WITH THE 26-INCH EQUATORIAL

By J. B. EPPES

This work has been done with the assistance of Mr. H. E. Burton, who made the first eight observations of Oberon and has checked all the computations.

An observation of one of the outer satellites consisted usually of eight measures of each coordinate and was arranged symmetrically. The measures in position angle were made by bisecting the planet and satellite with a single thread. In distance the settings on the satellite were made with a double thread and on the planet with a single thread, the micrometer being turned through 180° during the observation to eliminate coincidence.

This plan was followed this year, 1911, for satellites of both Neptune and Uranus. The intention was to employ a prism for all measures, but there were very few nights when the satellites could be seen well enough to use the prism, and it was employed for only two observations.

Comparing the probable errors obtained at this apparition with those of the three years previous, it may be seen that the error in distance is relatively larger with the double thread. See *Astronomical Journal,* No. 627. However, since the probable error of an observation is less and the observers different, no definite statement as to the value of the double thread can be made. The interval between these threads was 6″, and personally I would have preferred a lesser one, perhaps 4″.

Coincidence with the micrometer screw vertical was taken on several occasions, and in no case did the difference between head up and head down exceed 0″.04 during the time when these observations were being made.

Positions of the satellites and the differential coefficients were computed from the data of the *Connaissance des Temps.*

Ariel and Umbriel were compared with the outer satellites, a strip of black paper pasted to the eyepiece being placed over the planet. The observations were similar to those of Oberon and Titania. The double thread was used on the faint satellite. The relative positions of the inner satellites compared with the outer have been computed from the *Connaissance des Temps* for the times of position-angles and are given below.

Micrometer Clark II was used and the screw value taken as

$$9''.9337+0''.00006\ (\mathrm{T}-50°\ \mathrm{F.}).$$

Observations of Oberon and Titania

OBERON

Date	W. M. T.[1]	Observed p	dp	s sin dp	Wt.	v	Observed s	ds	Wt.	v
1911	h m s	° ′	° ′	″		″	″	″		″
June 9	11 56 47	14 1.3	−0 14.4	−0.175	1	+0.343	41.04	+0.74	1	+0.685
18	12 2 58	255 31.4	−0 20.0	−0.186	0.5	+0.084	31.65	+0.39	1	+0.234
21	11 30 41	345 39.7	−1 21.3	−0.983	1	−0.425	41.11	+0.46	1	+0.507
27	11 31 43	148 51.5	−1 6.7	−0.747	1	−0.210	39.03	−0.53	1	−0.344
29	10 40 29	189 11.8	−0 5.2	−0.065	1	+0.238	43.25	−0.50	1	−0.400
30	10 23 22	210 42.7	−0 17.5	−0.200	1	+0.028	39.52	−0.17	1	−0.186
July 5	11 6 39	355 22.4	−0 21.1	−0.264	1	+0.288	42.72	+0.25	1	+0.280
24	8 58 49	147 45.3	−0 55.0	−0.618	1	−0.074	39.21	−0.61	1	−0.430
27	10 12 34	214 2.0	−1 16.9	−0.880	0.5	−0.460	38.83	+0.53	1	+0.511
30	8 29 36	306 47.0	−0 54.5	−0.554	1	−0.044	34.87	+0.10	1	+0.047
31	9 26 24	334 24.0	−0 35.3	−0.410	1	+0.155	39.85	+0.11	1	+0.143
Aug. 16	7 1 34	26 10.3	−0 34.1	−0.404	1	+0.128	40.71	−0.02	1	−0.108
18	7 34 24	84 17.9	−0 14.6	−0.139	0.5	+0.340	33.51	−0.73	0.5	−0.569
21	7 25 41	170 19.1	−0 30.0	−0.368	1	+0.055	41.86	+0.32	1	+0.494
22	6 47 19	190 26.8	−0 38.1	−0.472	1	−0.162	42.71	−0.10	1	+0.006
Sept. 11	5 49 7	6 13.8	−1 1.3	−0.755	1	−0.211	43.13	−0.81	1	−0.810
12	5 37 59	27 16.7	−0 50.5	−0.589	1	−0.060	40.31	−0.21	1	−0.294

TITANIA

Date	W. M. T.[1]	Observed p	dp	s sin dp	Wt.	v	Observed s	ds	Wt.	v
June 1	12 33 47	1 14.3	−1 1.5	−0.568	1	+0.112	31.82	−0.09	1	+0.180
9	12 34 28	339 4.6	−1 1.8	−0.540	0.5	+0.197	30.85	−0.83	0.5	−0.270
18	11 18 40	347 17.3	−1 15.3	−0.682	1	+0.089	31.90	−0.71	1	−0.306
27	10 45 58	355 50.6	−1 14.7	−0.695	1	+0.031	32.71	−0.72	1	−0.384
28	10 11 41	27 25.3	−1 53.3	−0.991	1	−0.333	30.09	−0.03	1	−0.006
29	11 23 22	73 0.2	−1 44.9	−0.744	1	+0.053	23.97	+0.43	1	+0.389
30	11 34 14	127 43.7	−2 19.9	−1.046	1	−0.209	25.98	−0.27	1	+0.013
July 5	9 48 28	330 59.3	−1 17.8	−0.659	1	+0.233	29.72	−0.59	1	−0.129
18	10 19 5	149 11.8	−0 57.8	−0.488	1	+0.294	28.77	+0.23	1	+0.572
24	9 54 10	23 45.2	−2 0.9	−1.086	1	−0.419	30.66	+0.22	1	+0.291
30	9 11 16	277 11.2	−1 38.5	−0.696	1	+0.389	23.89	+0.39	1	+0.494
Aug. 18	6 58 15	344 12.8	−1 56.9	−1.046	1	−0.225	31.55	−0.78	1	−0.361
21	7 53 41	107 3.8	−1 38.8	−0.708	1	+0.146	24.99	−0.36	1	−0.208
22	7 18 13	152 0.8	−1 55.3	−0.977	1	−0.198	29.34	−0.21	1	+0.118
Sept. 11	6 58 5	245 47.3	−2 30.6	−1.118	1	−0.162	25.64	−0.10	1	−0.215
13	7 7 8	339 47.3	−1 21.1	−0.704	1	+0.137	30.37	−0.52	1	−0.101

[1] Corrected for light time.

Observations of Ariel and Umbriel

ARIEL–TITANIA

Date	W. M. T.[1]	Observed p	Computed p	W. M. T.[1]	Observed s	Computed s	Comparisons
1911	h m s	° ′	° ′	h m s	″	″	
Sept. 13	6 26 17	325 50.6	324 43.4	6 27 37	17.32	16.96	6, 6

ARIEL–OBERON

July 31	8 3 25	343 43.5	342 21.5	8 4 32	52.14	51.27	6, 6

UMBRIEL–TITANIA

July 19	9 16 59	161 39.8	160 55.0	9 23 12	13.63	14.38	4, 4
25	9 27 0	114 29.7	108 38.9	9 27 35	23.64	23.51	4, 6
27	8 31 2	132 57.5	129 26.5	8 34 2	12.76	12.91	6, 8

[1] Corrected for light time.

UMBRIEL-OBERON

July 27	9 16 14	237 14. 2	237 48. 8	9 17 6	25. 99	26. 37	6, 6
31	8 42 53	337 36. 6	336 46. 3	8 41 48	58. 49	58. 63	6, 7
Aug. 21	6 43 15	162 13. 3	161 52. 3	6 43 45	23. 40	23. 02	8, 8
Sept. 13	5 42 22	85 52. 6	83 11. 1	5 44 50	24. 75	25. 34	8, 9

The observation times have been corrected for light time, and the observed distances of Oberon and Titania have been reduced to the times of position angles. The residuals were found by substituting in the weighted equations. All of the coefficients in the observation equations were divided by the antilogarithm of 0.5. The observation equations are taken in the sense computed minus observed.

For Oberon and Titania, respectively, the following assumed elements are taken from the *Connaissance des Temps*, for July 24.77944 and July 21.27944, Washington mean time, corrected for light time:

	Oberon	Titania
	°	°
u	253. 610	2. 080
N	166. 216	166. 216
I	75. 258	75. 258
	"	"
a	42. 15	31. 46

Normal Equations

OBERON

	[0.5] sin du	[0.5] sin dN	[0.5] sin dI	[0.5] $2e$ sin Q	[0.5] $2e$ cos Q	[0.5] $\frac{da}{a}$	n
[0.5] sin du	+1975. 10	+733. 09	+972. 07	− 34. 38	+ 141. 41	− 8. 51	−81. 842
[0.5] sin dN		+654. 97	+365. 50	+ 14. 75	+ 24. 00	+ 441. 19	−27. 414
[0.5] sin dI			+865. 84	+ 39. 46	+ 96. 73	− 115. 50	−45. 187
[0.5] $2e$ sin Q				+1302. 39	− 35. 07	− 60. 08	−13. 599
[0.5] $2e$ cos Q					+1329. 70	− 30. 72	−14. 982
[0.5] $\frac{da}{a}$						+2625. 56	− 5. 125

$[nn]=7.666$

TITANIA

[0.5] sin du	+1201. 64	+315. 57	+448. 62	+174. 53	+270. 68	+ 97. 07	−115. 220
[0.5] sin dN		+332. 29	+ 52. 22	+ 70. 51	+154. 60	+ 326. 30	− 32. 911
[0.5] sin dI			+435. 06	+ 64. 78	+249. 05	− 201. 72	− 39. 882
[0.5] $2e$ sin Q				+823. 64	−186. 47	− 264. 31	− 1. 150
[0.5] $2e$ cos Q					+697. 63	+ 100. 20	− 31. 039
[0.5] $\frac{da}{a}$						+1279. 31	− 34. 517

$[nn]=13.975$

Results

OBERON

$\sin du = +0.01282 \pm 0.00312$	$du = +\ 0.^\circ 735 \quad \pm 0.^\circ 179$
$\sin dN = -0.00459 \pm 0.00456$	$dN = -\ 0.^\circ 263 \quad \pm 0.^\circ 261$
$\sin dI = +0.00386 \pm 0.00410$	$dI = +\ 0.^\circ 221 \quad \pm 0.^\circ 235$
$2e \sin Q = +0.00371 \pm 0.00222$	$Q = 60.^\circ 06$
$2e \cos Q = +0.00214 \pm 0.00220$	$e = 0.00214$
$\frac{da}{a} = +0.00171 \pm 0.00175$	$da = +\ 0.''072 \quad \pm 0.''074$

	Sum of squares of residuals	Number of equations	P. e. of one equation
			"
sdp	0. 944	17	±0. 198
ds	2. 962	17	±0. 350
sdp+*ds*	3. 906	34	±0. 252

TITANIA

$\sin du = +0.03103 \pm 0.00278$	$du = +\ 1.^\circ 778 \quad \pm 0.^\circ 159$
$\sin dN = -0.00442 \pm 0.00515$	$dN = -\ 0.^\circ 253 \quad \pm 0.^\circ 295$
$\sin dI = +0.00057 \pm 0.00473$	$dI = +\ 0.^\circ 033 \quad \pm 0.^\circ 271$
$2e \sin Q = -0.00347 \pm 0.00258$	$Q = 285.^\circ 02$
$2e \cos Q = +0.00093 \pm 0.00306$	$e = 0.00180$
$\frac{da}{a} = +0.00661 \pm 0.00239$	$da = +\ 0.''208 \quad \pm 0.''075$

	Sum of squares of residuals	Number of equations	P. e. of one equation
			"
sdp	0. 842	16	±0. 196
ds	1. 413	16	±0. 254
sdp+*ds*	2. 255	32	±0. 199

The resulting elements are as follows for Washington mean time, corrected for light time:

OBERON, 1911, July 24.77944	TITANIA, 1911 July 21.27944
$u = 254.^\circ 345$	$u = 3.^\circ 858$
$N = 165.^\circ 953$	$N = 165.^\circ 963$
$I = 75.^\circ 479$	$I = 75.^\circ 291$
$Q = 60.^\circ 06$	$Q = 285.^\circ 02$
$e = 0.00214$	$e = 0.00180$
$a = 42.''22$	$a = 31.''67$

CORRECTIONS TO ELEMENTS OF THE ORBIT OF THE SATELLITE OF NEPTUNE

FROM

OBSERVATIONS IN 1911

CORRECTIONS TO ELEMENTS OF THE ORBIT OF THE SATELLITE OF NEPTUNE FROM OBSERVATIONS IN 1911 MADE WITH THE 26-INCH EQUATORIAL

By ASAPH HALL AND H. E. BURTON

As stated in the report of the Superintendent for 1911, it was not possible to begin observations of Neptune's satellite at the opposition of 1910–11 until January 28, 1911, because an investigation and correction of the periodic errors of the driving clock was being made and because, also, of certain repairs necessary to Clark Micrometer II, which was used. However, it was considered advisable that Messrs. Hall and Burton should each make a series of measures, partly with a view of obtaining some idea as to systematic differences between them.

For observations of Neptune's satellite and determinations of the elements of the orbit reference may be made to the following:

No. 4, Tome XLII, *Mémoires de l'Académie Impériale des Sciences de St. Pétersbourg,* VII^E Série; the *Astronomische Nachrichten;* the *Astronomical Journal; Monthly Notices of the Royal Astronomical Society;* and *Bulletins of the Lick Observatory.*

The observations printed herewith were taken with red wires, the satellite being placed between a pair of movable threads about 6″ apart. The normal observation consisted of four position angles, four distances, four distances and four position angles. After the first set of distances the position circle was turned 180°. It was intended to use a reversing prism eyepiece for all measures, but this was possible only when the seeing was fine.

The value of the micrometer screw employed is

$$R = 9''.9337 + 0''.00006\ (T^\circ - 50^\circ\ F.).$$

The times of observation as printed are Washington mean times corrected for light time. The observation equations are taken in the sense computed minus observed. The residuals are obtained by substituting in the weighted equations. The computations were made by Messrs. Eppes, Burton, and Watts. The assumed circular elements, including the mean motion, are taken from the *Connaissance des Temps.* The assumed value of the semimajor axis of the satellite's orbit is for log $(\rho) = 1.47814$.

Satellite of Neptune 1911, Hall

Date	W. M. T.[1]	Observed p	dp	$s \sin dp$	Wt.	v	W. M. T.[1]	Observed s	ds	Wt.	v
1911	h m s	° ′	° ′	″		″	h m s	″	″		″
Jan. 28	6 9 42	286 20.2	+0 23.4	+0.115	1	−0.226	6 32 25	16.78	+0.07	1	+0.146
Feb. 2	7 51 14	322 55.8	+1 55.3	+0.456	1	+0.238	7 58 22	13.51	+0.13	1	+0.234
21	8 1 38	261 4.0	+1 5.8	+0.293	0.5	−0.067	8 17 6	15.11	+0.15	0.5	+0.137
23	3 50 14	128 58.8	+1 15.0	+0.328	0.5	+0.109	-----	-----	----	---	-----
23	7 16 30	122 33.2	+0 50.0	+0.229	0.8	+0.053	7 33 27	16.08	−0.32	0.8	−0.112
24	6 2 48	82 55.0	+0 13.9	+0.062	1	−0.092	6 21 9	15.66	−0.31	1	−0.174
Mar. 1	5 36 42	120 30.0	+0 26.0	+0.120	1	−0.048	5 53 57	16.19	−0.26	1	−0.070
3	5 52 29	359 36.1	+1 10.0	+0.227	1	+0.073	6 8 23	11.22	−0.03	1	+0.055
4	7 6 33	295 6.1	+0 27.0	+0.128	1	−0.181	7 21 17	16.35	−0.05	1	+0.043
8	5 51 53	69 20.3	+1 26.3	+0.353	0.5	+0.145	-----	-----	----	---	-----
10	5 12 27	291 50.9	+1 50.2	+0.524	1	+0.211	5 31 30	16.36	+0.01	1	+0.101
16	4 40 49	288 25.0	+1 4.6	+0.310	1	−0.015	5 0 57	16.48	+0.01	1	+0.094
21	4 26 50	333 33.9	+1 57.3	+0.421	1	+0.229	4 45 4	12.47	−0.06	1	+0.034
24	5 2 5	150 46.2	−1 13.7	−0.275	1	−0.476	5 24 41	13.35	−0.45	1	−0.230
25	6 4 34	99 37.0	+0 1.2	+0.006	1	−0.154	6 25 8	16.69	−0.31	1	−0.154
28	4 5 36	279 50.3	+0 39.0	+0.186	1	−0.164	4 23 55	16.45	−0.06	1	+0.007
30	5 55 55	139 6.2	+0 27.1	+0.108	0.5	−0.054	-----	-----	----	---	-----
31	4 5 8	96 10.2	+1 49.1	+0.517	1	+0.358	4 27 30	16.46	−0.20	1	−0.049
31	5 41 20	94 9.1	+1 4.5	+0.303	1	+0.143	6 8 42	16.29	−0.18	1	−0.031

[1] Corrected for light time.

Normal Equations and Results

	$\sin du$	$\sin dN$	$\sin dI$	$2e \sin Q$	$2e \cos Q$	$\frac{da}{a}$	n
$\sin du$	+2714.31	+213.57	+692.69	− 227.60	+ 517.61	+ 234.17	−48.143
$\sin dN$		+614.68	+171.48	+ 18.32	− 201.18	− 149.76	− 9.287
$\sin dI$			+924.51	+ 193.13	− 20.23	− 588.67	−10.163
$2e \sin Q$				+1527.51	+ 167.36	− 106.66	− 8.574
$2e \cos Q$					+2083.52	+ 85.90	− 3.424
$\frac{da}{a}$						+3587.14	−28.425

$[nn] = +2.192$

$\sin du = +0.01816 \pm 0.00293$	$du = +\ 1^{\circ}.041 \ \pm 0^{\circ}.168$
$\sin dN = +0.00982 \pm 0.00537$	$dN = +\ 0^{\circ}.562 \ \pm 0^{\circ}.308$
$\sin dI = -0.00186 \pm 0.00517$	$dI = -\ 0^{\circ}.107 \ \pm 0^{\circ}.296$
$2e \sin Q = +0.00927 \pm 0.00332$	$Q = 107^{\circ}.83$
$2e \cos Q = -0.00298 \pm 0.00289$	$e = 0.00487$
$\frac{da}{a} = +0.00719 \pm 0.00226$	$da = +\ 0''.117 \ \pm 0''.037$

	Sum of squares of residuals	Number of equations	P. e. of one equation
			″
sdp	0.722	19	±0.159
ds	0.248	16	±0.106
sdp and ds	0.970	35	±0.123

1911, March 9.27944 W. M. T., corrected for light time:

ASSUMED ELEMENTS	CORRECTED ELEMENTS
$u = 93^{\circ}.775$	$u = 94^{\circ}.816$
$N = 188^{\circ}.281$	$N = 188^{\circ}.843$
$I = 115^{\circ}.853$	$I = 115^{\circ}.746$
$a = 16''.272$	$Q = 107^{\circ}.83$
	$e = 0.00487$
	$a = 16''.389$

Satellite of Neptune 1911, Burton

Date	W. M. T.[1]	Observed p	dp	$s \sin dp$	Wt.	v	W. M. T.[1]	Observed s	ds	Wt.	v
1911	h m s	° ′	° ′	″		″	h m s	″	″		″
Jan. 30	6 43 13	147 45.4	+4 7.7	+0.933	0.8	+0.701	- -- --	-----	----	---	-----
Feb. 2	9 41 58	318 52.6	+1 23.5	+0.342	1	−0.166	9 46 28	14.03	+0.07	1	+0.163
21	6 18 2	264 35.9	+0 57.1	+0.260	0.8	−0.086	7 8 41	15.47	+0.03	0.8	+0.072
23	6 26 6	125 22.4	−0 22.3	−0.101	0.8	−0.200	6 55 59	16.05	−0.40	0.8	−0.312
24	7 33 22	79 39.2	+0 26.9	+0.118	1	+0.031	8 0 32	14.81	+0.18	1	+0.127
27	5 53 22	259 8.0	+1 20.7	+0.355	1	+0.019	6 29 34	15.10	−0.11	1	−0.069
Mar. 1	6 52 17	117 48.1	+0 49.5	+0.231	1	+0.114	7 15 4	16.24	−0.11	1	−0.060
2	5 10 14	77 45.4	+4 8.1	+1.077	0.5	+0.702	5 39 18	14.87	−0.04	0.5	−0.068
4	5 45 17	295 50.8	+2 6.9	+0.594	1	+0.111	6 8 16	16.12	+0.03	1	+0.165
8	6 37 38	69 48.7	−0 51.4	−0.207	0.5	−0.220	7 4 18	13.20	+0.54	0.5	+0.313
10	6 41 11	289 59.8	+1 8.2	+0.327	1	−0.135	7 3 13	16.52	−0.03	1	+0.096
11	4 57 25	247 56.4	+1 28.5	+0.357	1	+0.063	5 16 19	13.93	−0.13	1	−0.103
16	6 16 4	285 27.5	+1 21.0	+0.390	1	−0.056	6 39 41	16.75	−0.20	1	−0.084
20	5 25 24	56 18.6	+0 11.3	+0.041	1	−0.102	6 4 26	12.01	+0.45	1	+0.311
21	5 50 40	329 9.5	+2 15.8	+0.500	1	+0.013	6 10 43	12.68	+0.07	1	+0.115
23	4 35 53	234 10.7	+0.25.0	+0.090	1	−0.162	5 0 10	12.70	−0.36	1	−0.340
24	6 37 12	146 18.1	−1 2.6	−0.240	1	−0.377	6 56 5	13.34	−0.06	1	−0.012
25	4 26 23	102 35.5	−0 11.4	−0.055	1	−0.149	4 49 53	16.59	−0.14	1	−0.111
28	5 51 8	275 25.3	+2 4.4	+0.590	1	+0.187	6 14 47	16.44	−0.17	1	−0.081
30	4 48 24	142 14.5	+0 4.9	+0.019	1	−0.117	5 9 9	13.61	−0.08	1	−0.032

[1] Corrected for light time.

Normal Equations and Results

	$\sin du$	$\sin dN$	$\sin dI$	$2e \sin Q$	$2e \cos Q$	$\frac{da}{a}$	n
$\sin du$	+3246.75	− 43.57	+ 485.38	+ 213.45	− 250.03	− 46.77	−64.510
$\sin dN$		+830.12	− 53.91	+ 135.02	+ 121.29	+ 258.60	− 7.524
$\sin dI$			+1073.21	− 35.05	− 100.77	− 823.12	−14.035
$2e \sin Q$				+1727.52	− 163.71	− 67.01	−26.624
$2e \cos Q$					+2486.25	+ 255.56	−15.176
$\frac{da}{a}$						+3862.55	−10.961

$[nn] = +3.871$

$\sin du = +0.01830 \pm 0.00303$
$\sin dN = +0.00578 \pm 0.00584$
$\sin dI = +0.00974 \pm 0.00573$
$2e \sin Q = +0.01388 \pm 0.00403$
$2e \cos Q = +0.00852 \pm 0.00334$
$\frac{da}{a} = +0.00442 \pm 0.00295$

$du = +1^\circ.048 \pm 0^\circ.174$
$dN = +0^\circ.331 \pm 0^\circ.334$
$dI = +0^\circ.558 \pm 0^\circ.328$
$Q = 58^\circ.46$
$e = 0.00814$
$da = +0''.072 \pm 0''.048$

	Sum of squares of residuals	Number of equations	P. e. of one equation
			″
sdp	1.407	20	±0.214
ds	0.557	19	±0.140
sdp and ds	1.964	39	±0.165

1911, March 9.27944, W. M. T., corrected for light time.

ASSUMED ELEMENTS

$u = 93^\circ.775$
$N = 188^\circ.281$
$I = 115^\circ.853$
$a = 16''.272$

CORRECTED ELEMENTS

$u = 94^\circ.823$
$N = 188^\circ.612$
$I = 116^\circ.411$
$Q = 58^\circ.46$
$e = 0.00814$
$a = 16''.344$

CORRECTIONS TO ELEMENTS OF THE ORBIT OF THE SATELLITE OF NEPTUNE

FROM

OBSERVATIONS IN 1911, 1912

CORRECTIONS TO ELEMENTS OF THE ORBIT OF THE SATELLITE OF NEPTUNE, FROM OBSERVATIONS IN 1911, 1912, MADE WITH THE 26-INCH EQUATORIAL

By H. E. BURTON

The following observations of the satellite of Neptune in position angle and distance with respect to the planet were made with the micrometer Clark II. The adopted value of one revolution of the screw was $9''.9337 + 0''.00006\ (T° - 50°\ F.)$.

An observation of the satellite consisted of four measures of the position angle and usually four measures of the distance, the chronometer time of each measure being recorded. The measures were made in the following order: two of the position angle, four of the distance, and two of the position angle; in two instances, however, an extra measure of the distance was made, viz: on January 13 and March 10. Thus the means of the times for position angle and distance were nearly the same; the greatest difference was $6^m\ 36^s$ on December 18.

The position angle was measured by placing a single long wire over the center of the planet and over the satellite. The mean of the first two measures of the position angle gave the position-circle setting for the measure of the distance. The difference between this mean and the final mean of four measures was not enough to affect the measured distance. Single short wires (perpendicular to the long wire) were used for the distance measures, one being placed over the center of the planet and another over the satellite. Coincidence was eliminated by changing the movable wire over from one object to the other after two measures were made. The wires when in use were illuminated with red light, but when the long wire was used the light was turned off of the short wires, and vice versa. The observed distances were corrected to correspond to the time of position angle and in 62 cases out of 85 the correction was zero. The largest correction was $0''.03$. The observations were corrected for differential refraction and instrumental constants.

The magnifying power used was generally 388. A power of 495 was used for the first two observations on January 22, and a power of 367 was used on December 18, 19, January 10, March 29, 31, April 6, 9. On December 18 a reversing prism was used. On some nights the satellite was very faint, especially on January 13, February 14, February 28, March 2, and March 13.

The Washington mean times as published have been corrected for light time. Corresponding to these times the position angle, p, and distance, s, were computed from data given in the *Connaissance des Temps*,[1] assuming the orbit to be circular, and comparisons were made with the observed values. The differences dp and ds as tabulated were taken equal to the computed values minus the observed. The residuals are given under v. The seeing is indicated as follows: 2 = good, 3 = fair, 4 = poor. The observations of both p and s were all given the weight unity. Log (ρ) was taken equal to 1.47814. The computations were made by C. B. Watts and checked by the observer.

[1] According to elements by Hermann Struve in *Mémoires de l'Académie de Saint-Pétersbourg*, Tome XLII, No. 4.

Date	W. M. T.[1]	Observed p	dp	s sin dp	v	Observed s	ds	v	Seeing
1911	h m s	° ′	° ′	″	″	″	″	″	
Dec. 18	8 16 41	245 47.7	+0 32.4	+0.124	−0.235	13.23	−0.08	+0.008	3
18	8 49 58	243 58.8	+0 49.8	+0.188	−0.166	13.16	−0.15	−0.061	3
19	8 54 31	160 23.7	−0 8.0	−0.029	−0.263	12.41	+0.11	+0.216	3
19	9 19 53	157 24.1	+1 35.8	+0.352	+0.118	12.66	−0.04	+0.067	3
1912									
Jan. 10	7 25 10	273 4.0	+1 33.5	+0.441	+0.006	16.42	−0.19	−0.117	3
10	7 54 36	271 9.4	+2 34.9	+0.728	+0.295	16.11	+0.05	+0.123	3
10	9 1 28	269 25.4	+2 15.6	+0.630	+0.201	16.03	−0.06	+0.014	3
10	9 25 33	268 24.1	+2 31.8	+0.702	+0.273	15.93	−0.03	+0.045	3
13	6 3 29	93 35.4	+0 47.7	+0.225	+0.038	15.93	+0.29	+0.491	4
13	6 30 21	91 43.0	+1 51.4	+0.523	+0.340	16.81	−0.66	−0.457	4
19	6 5 25	88 35.5	+0 10.0	+0.046	−0.113	15.97	−0.26	−0.057	2
19	6 32 48	88 12.4	−0 19.9	−0.090	−0.244	15.81	−0.19	+0.015	2
19	7 21 47	86 23.8	−0 7.9	−0.036	−0.182	15.63	−0.17	+0.035	2
19	8 13 49	84 10.0	+0 21.0	+0.093	−0.044	15.42	−0.15	+0.053	2
20	6 47 45	15 24.1	+0 18.7	+0.060	+0.038	11.06	−0.01	−0.015	2
20	7 25 58	13 8.0	+0 6.2	+0.020	−0.007	11.09	−0.02	−0.033	2
20	8 44 8	7 34.4	+0 38.5	+0.125	+0.084	11.04	+0.11	+0.085	2
20	9 13 51	5 17.6	+1 1.9	+0.201	+0.153	11.28	−0.09	−0.118	2
21	6 36 56	306 2.9	+1 11.2	+0.328	−0.039	15.97	−0.15	−0.148	3
21	7 5 32	305 39.1	+0 41.0	+0.190	−0.182	15.94	−0.03	−0.024	3
22	5 51 25	266 1.8	+0 16.0	+0.072	−0.346	15.60	−0.13	−0.051	3
22	6 19 42	264 45.5	+0 35.8	+0.160	−0.256	15.19	+0.18	+0.258	3
22	7 1 28	262 9.7	+1 46.5	+0.471	+0.060	15.20	+0.01	+0.090	3
22	7 26 54	260 39.1	+2 24.6	+0.636	+0.226	15.05	+0.07	+0.150	3
24	6 21 29	123 41.8	+1 14.0	+0.345	+0.086	15.87	+0.16	+0.288	3
24	6 45 58	122 51.9	+1 18.8	+0.369	+0.111	16.09	0.00	+0.131	3
24	7 55 40	121 1.4	+1 2.7	+0.297	+0.040	16.73	−0.46	−0.324	3
24	8 26 10	120 48.8	+0 20.7	+0.098	−0.159	16.37	−0.03	+0.107	3
27	8 10 56	297 2.7	+1 55.8	+0.555	+0.148	16.79	−0.30	−0.276	3–4
27	8 50 0	297 7.2	+0 43.3	+0.209	−0.202	16.75	−0.19	−0.160	3–4
Feb. 2	7 19 15	293 41.4	+1 37.0	+0.470	+0.050	16.59	+0.08	+0.117	3
2	7 57 13	292 51.8	+1 22.0	+0.399	−0.023	16.90	−0.18	−0.140	3
5	7 14 49	112 0.1	+0 53.7	+0.262	+0.014	16.83	−0.08	+0.077	4
6	5 35 41	69 46.6	+0 37.4	+0.150	+0.078	13.88	−0.11	+0.071	3–4
6	6 2 29	69 5.9	+0 10.6	+0.042	−0.026	13.78	−0.12	+0.060	3–4
6	7 42 12	64 38.5	+0 16.5	+0.064	+0.014	13.41	−0.18	−0.012	3–4
6	8 21 19	63 7.8	−0 0.3	−0.001	−0.046	12.96	+0.10	+0.262	3–4
8	6 54 13	289 30.7	+1 26.9	+0.424	−0.006	16.77	+0.02	+0.066	3–4
8	7 29 29	288 35.1	+1 23.2	+0.407	−0.025	17.02	−0.22	−0.171	3–4
9	7 14 12	239 59.3	+2 8.6	+0.485	+0.140	13.43	−0.46	−0.372	4
9	8 3 59	237 41.3	+2 4.3	+0.462	+0.124	12.93	−0.16	−0.071	4
13	6 35 30	333 54.2	+1 43.4	+0.384	+0.190	12.70	+0.07	+0.011	3
13	7 8 31	332 59.2	+1 3.9	+0.240	+0.037	12.67	+0.24	+0.182	3
13	8 16 56	329 22.1	+1 31.4	+0.351	+0.129	13.06	+0.14	+0.086	3
14	5 11 41	287 18.0	+1 30.9	+0.444	+0.011	16.80	−0.01	+0.041	3
14	5 39 43	287 6.8	+0 55.1	+0.269	−0.165	16.82	−0.03	+0.022	3
14	6 46 47	284 52.1	+1 17.5	+0.378	−0.059	16.73	+0.05	+0.106	2–3
14	7 17 3	283 57.1	+1 21.7	+0.398	−0.039	16.38	+0.39	+0.449	2–3
17	4 56 53	105 59.0	+0 44.6	+0.218	−0.016	17.01	−0.24	−0.069	3
17	5 22 1	105 5.2	+0 56.3	+0.275	+0.043	16.90	−0.14	+0.033	3
17	6 14 58	103 26.5	+1 6.1	+0.322	+0.095	16.98	−0.24	−0.064	3
17	6 40 39	103 49.1	+0 0.3	+0.001	−0.224	16.89	−0.17	+0.008	3
23	3 45 58	102 46.8	+0 55.3	+0.268	+0.044	17.07	−0.38	−0.203	3
23	4 16 57	101 48.4	+1 1.5	+0.298	+0.077	16.80	−0.14	+0.040	3
23	6 36 55	97 55.4	+0 55.6	+0.267	+0.061	16.63	−0.14	+0.048	3
23	7 7 39	97 17.9	+0 39.9	+0.191	−0.012	16.69	−0.25	−0.060	3

[1] Corrected for light time.

Date	W. M. T.[1]	Observed p_1	dp	$s \sin dp$	v	Observed s	ds	v	Seeing
1912	h m s	° ′	° ′	″	″	″	″	″	
Feb. 27	6 49 42	214 29. 3	+0 6. 6	+0. 022	−0. 253	11. 18	+0. 07	+0. 166	2
27	7 23 39	211 55. 4	+0 34. 4	+0. 112	−0. 160	11. 21	−0. 02	+0. 076	2
28	6 40 26	135 25. 6	+1 21. 6	+0. 345	+0. 098	14. 50	+0. 05	+0. 157	3
Mar. 2	5 53 42	313 44. 4	+1 31. 0	+0. 389	+0. 073	14. 63	+0. 06	+0. 035	3
2	6 29 2	312 17. 0	+1 42. 8	+0. 443	+0. 120	14. 86	−0. 04	−0. 061	3
7	5 54 24	21 1. 6	+0 18. 9	+0. 060	+0. 049	10. 76	+0. 19	+0. 201	2
7	6 31 3	18 46. 7	+0 11. 8	+0. 038	+0. 023	10. 78	+0. 15	+0. 154	2
10	6 7 3	193 25. 8	+1 23. 1	+0. 264	+0. 021	11. 31	−0. 39	−0. 294	3–4
10	6 44 42	191 30. 8	+0 52. 2	+0. 166	−0. 073	11. 14	−0. 20	−0. 103	3–4
13	5 24 31	11 50. 8	+0 0. 7	+0. 002	−0. 031	10. 86	+0. 07	+0. 052	3–4
13	5 57 31	9 18. 3	+0 26. 0	+0. 083	+0. 045	10. 93	+0. 02	−0. 004	3–4
16	5 56 39	182 20. 2	+1 50. 3	+0. 354	+0. 122	11. 08	−0. 04	+0. 056	2
16	6 31 19	180 52. 3	+1 8. 0	+0. 220	−0. 011	11. 22	−0. 12	−0. 025	2
17	5 51 14	119 38. 8	+1 10. 9	+0. 329	+0. 078	16. 09	−0. 12	+0. 011	2
17	6 21 32	118 40. 7	+1 14. 7	+0. 349	+0. 098	16. 22	−0. 18	−0. 047	2
18	5 40 51	77 7. 5	+0 44. 7	+0. 188	+0. 082	14. 61	−0. 17	+0. 021	2
18	6 9 58	76 20. 8	+0 26. 7	+0. 111	+0. 012	14. 36	−0. 04	+0. 150	2
29	5 4 13	110 48. 8	+1 4. 9	+0. 309	+0. 069	16. 52	−0. 15	+0. 001	3–4
29	5 35 57	110 13. 9	+0 46. 2	+0. 220	−0. 019	16. 52	−0. 12	+0. 034	3–4
31	3 56 18	345 9. 4	−0 0. 6	−0. 002	−0. 140	11. 86	−0. 09	−0. 152	3–4
31	4 33 35	342 32. 5	+0 35. 6	+0. 123	−0. 024	11. 90	0. 00	−0. 062	3–4
Apr. 6	4 25 45	334 3. 5	+0 29. 7	+0. 108	−0. 087	12. 44	+0. 06	0. 000	3
6	4 57 56	332 58. 9	+0 2. 7	+0. 010	−0. 194	12. 35	+0. 28	+0. 222	3
9	3 40 16	151 28. 4	+1 2. 1	+0. 229	+0. 001	13. 34	−0. 69	−0. 595	4
9	4 26 8	148 50. 2	+1 33. 8	+0. 350	+0. 121	13. 11	−0. 27	−0. 175	4
10	4 41 46	102 13. 3	+0 22. 0	+0. 104	−0. 112	16. 49	−0. 22	−0. 046	3
10	5 15 16	101 7. 4	+0 31. 2	+0. 147	−0. 065	16. 46	−0. 22	−0. 043	3
11	4 13 21	50 44. 8	−0 36. 2	−0. 124	−0. 135	12. 35	−0. 58	−0. 467	3–4
11	4 48 59	48 19. 5	−0 7. 0	−0. 024	−0. 031	12. 05	−0. 40	−0. 295	3–4

[1] Corrected for light time.

Normal Equations and Results

	$\sin du$	$\sin dN$	$\sin dI$	$2e \sin Q$	$2e \cos Q$	$\frac{da}{a}$	n
$\sin du$	+15945. 63	−1022. 88	+1941. 82	−1112. 94	+ 1758. 86	− 288. 02	−239. 232
$\sin dN$		+4230. 25	− 444. 64	− 287. 86	− 890. 77	+ 1749. 92	− 75. 830
$\sin dI$			+5747. 51	+ 389. 53	+ 200. 82	− 4623. 10	− 41. 697
$2e \sin Q$				+8089. 94	− 1885. 31	− 130. 12	− 71. 634
$2e \cos Q$					+12370. 03	− 688. 88	+ 57. 642
$\frac{da}{a}$						+18058. 30	−114. 457

$[nn] = +11.694$

$\sin du = +0.01659 \pm 0.00089$ $\qquad du = +\ 0°.951 \pm 0°.051$

$\sin dN = +0.01998 \pm 0.00171$ $\qquad dN = +\ 1°.145 \pm 0°.098$

$\sin dI = +0.00793 \pm 0.00163$ $\qquad dI = +\ 0°.454 \pm 0°.093$

$2e \sin Q = +0.01071 \pm 0.00123$ $\qquad Q = 109°.11$

$2e \cos Q = -0.00371 \pm 0.00099$ $\qquad e = 0.00567$

$\frac{da}{a} = +0.00663 \pm 0.00092$ $\qquad da = +\ 0''.108 \pm 0''.015$

	Sum of squares of residuals	Number of equations	P. e. of one equation
			$''$
$s \sin dp$	+1. 504	85	±0. 093
ds	+2. 641	85	±0. 123
$s \sin dp$ and ds	+4. 145	170	±0. 107

February 15.3, 1912, Washington mean time, corrected for light time.

ASSUMED ELEMENTS

$u=225^\circ.090$
$N=188^\circ.423$
$I=115^\circ.698$
$a=16''.272$
$e=0$

CORRECTED ELEMENTS

$u=226^\circ.041$
$N=189^\circ.568$
$I=116^\circ.152$
$Q=109^\circ.11$
$e=0.00567$
$a=16''.380$

PART II

PHOTOGRAPHIC EQUATORIAL OBSERVATIONS

1912-1924

AND

PHOTOHELIOGRAPHIC OBSERVATIONS

1917-1927

PHOTOGRAPHIC EQUATORIAL OBSERVATIONS

ASTEROID OBSERVATIONS BY PHOTOGRAPHIC METHODS

MADE WITH 6-INCH DALLMEYER LENSES OF 39 INCHES FOCAL LENGTH AND WITH THE 10-INCH TRIPLE LENSES OF 113 INCHES FOCUS

By G. H. Peters

Asteroid observations by photographic methods were begun at the United States Naval Observatory in 1902.[1] A Dallmeyer portrait lens of 6 inches aperture and 39 inches focal length, with its camera, was then employed. For several years this apparatus remained attached to the middle section of the 26-inch equatorial tube and was of great assistance in locating asteroids, some of which were considerably off their ephemeris positions. Many asteroids thus located were observed micrometrically with the 26-inch or 12-inch equatorials. The Watson group, observed at Dr. A. O. Leuschner's request, is an instance. A few of these plates where asteroids were located, but not observed micrometrically, were measured with comparison stars on the Stackpole measuring engine. These asteroid positions were subsequently reduced and published.

Dry plates for this 6-inch camera were 4 by 5 inches, giving a field of about 5° by 6°. Stellar definition near the corners of the plates was only fair, but over the remainder of the field star images were good. Except occasionally the 26-inch equatorial was unavailable as a guiding telescope for the 6-inch portrait lens.

A new mounting had been provided for the 26-inch equatorial upon the observatory's removal to its present site in 1893 and on this Warner and Swasey mounting the optical parts only of the original Clark equatorial were retained.[2] Subsequently, in 1904, the mechanical parts of the Clark mounting were reassembled and adapted for use as the basis of a photographic telescope. This plan was due to Mr. W. W. Dinwiddie, then spectroscopic assistant, who performed most of the work involved. The instrument was erected in a wooden building in the southern part of the observatory grounds.

The central section only of the old 26-inch telescope tube which carries the parts for attachment to the declination axis was retained. This central section is about 10 feet long, with a diameter of 31 inches, and is reenforced by substantial cast-iron flanges at either end. Upon this tube as a support a pair of 6-inch Dallmeyer lenses of 39 inches focal length, with their twin cameras, was placed. These lenses were part of a set originally acquired by the Naval Observatory for securing coronal photographs at the total solar eclipse of 1878 and have also been used at several more recent total eclipses.[3]

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[1] See Superintendent's Report for 1902, p. 15.

[2] For brief description see Popular Astronomy, Vol. XXVII, No. 5, p. 278, by Asaph Hall; also Publications of the U. S. Naval Observatory, Second Series, Vol. VI.

[3] See Superintendent's Report, 1878, p. 7 et seq.

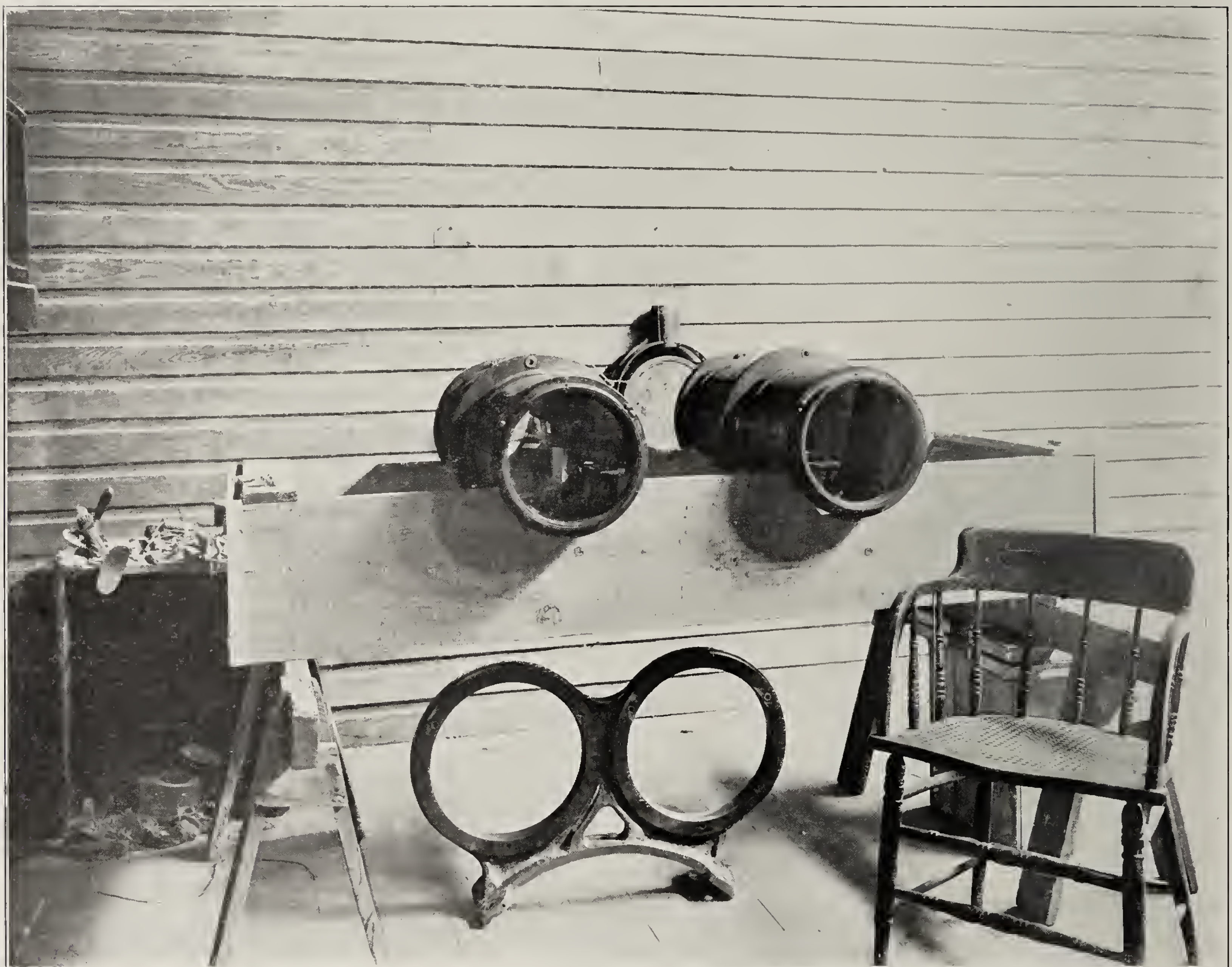
At the present observatory site a new 12-inch equatorial had taken the place of the 9.6-inch equatorial which was in use at the old Naval Observatory, consequently parts of the 9.6-inch telescope were available for a guiding telescope on the modified Clark mounting. The 9.6-inch objective, with the tapering tube of wood veneer, the filar micrometer and eyepieces, were the parts adapted to this purpose. The optical axis of the guiding telescope was placed centrally inside the 10-foot tube of the old Clark mounting. Its line of collimation therefore was coincident with the collimation axis of the former 26-inch objective. The guiding telescope tube is held in position by heavy wooden cross-supports, which are bolted to the flanges at either end of the 10-foot cylindrical tube. Circular openings in these cross-supports fit the taper of the guiding telescope where it passes through them, and this latter is secured in position by brass angle brackets attached both to it and to its supports.

The arrangement described has proven to be extremely rigid. Star images, even with the lenses of 113 inches focus hereafter described, show no appreciable guiding flexure on photographs of long exposure. The guiding telescope is about 14½ feet in length and therefore projects at either end beyond its supports on the 10-foot cylindrical tube. Originally the tube of the 26-inch Clark equatorial was about 32 feet long.[1] At the north and south the equatorial head or harp-shaped piece, carrying the polar axis and its appurtenances, is supported at its base upon brick piers. These piers, in turn, rest upon a concrete slab embedded in the ground. Supported on the concrete slab and in the flooring space between the piers the original Clark driving clock was located.

The photographic telescope, as sketched briefly above, functioned fairly well. The instrument was erected and its observing house built at a very slight initial expense and with it many observations of the brighter asteroids were made. By means of its circles the telescope is set to the approximate place of the asteroid in the heavens. A star near this place, of sufficient brightness for convenient guiding, is then selected in the finder and brought to the cross wires of the micrometer of the guiding telescope. During an exposure the usual method was to guide upon the computed motion of the asteroid, using the micrometer of the guiding telescope. The micrometer's position circle was first set to the computed position angle of the asteroid motion and the equivalent of this motion from the ephemeris was then applied to the movable wires of the micrometer. While observing, the guiding star is kept at the intersection of the cross wires of the micrometer, using the slow motions of the telescope when necessary. During the observation the asteroid is seldom in the field of view of the guiding telescope.

On this class of negatives the star images appear therefore as short trails, with the asteroid image approximately round. By this method the light energy of the asteroid image is conserved. Comparison stars used in the reductions are generally much brighter than the asteroid, and distributing the stellar light by trailing diminishes to some extent the intensity of the photographic images. The trails, provided they are not excessively long, can be measured as accurately on

[1] A full description of both the 9.6-inch and the 26-inch equatorials as mounted at the former site of the Naval Observatory was published in Astronomical and Meteorological Observations Made During the Year 1874 at the United States Naval Observatory, Appendix I, Washington, Government Printing Office, 1877. This volume is now out of print and rare.



THE TWIN 10-INCH TRIPLE OBJECTIVES AND MOUNTS OF THE PHOTOGRAPHIC EQUATORIAL

the measuring engine as a disk. The true time of observation is taken as that of midexposure. Long star trails might occur from a rapidly moving asteroid or they might be due to a lengthy exposure for a faint object. To facilitate measurement under these circumstances, a vacant space or gap is sometimes produced in the star trails during the exposure. This is effected in the following manner: For a short period near midexposure the shutters of the photographic objectives are closed. During this interval the micrometer motion is continuously applied in following. The centers of the gaps thus formed in trails of comparison stars are to be measured with respect to the center of the asteroid image. In this case the true time of observation is the mean of the interval during which the shutters were closed near midexposure.

For convenience tables have been computed giving values for position angle settings and micrometer intervals for all ordinary asteroid motions. They are based upon one-minute intervals for each new micrometer setting. The arguments used in these tables are: motions in α and δ, the former in time, with increments of $0^{m}.1$ in each table. At times several asteroid images are found upon a negative having different magnitudes and apparent motions. In case of observations of this class the position angle and micrometer interval selected favor the fainter object. If of nearly equal magnitudes but having different motions, the mean of the motions of the objects is used. With several asteroids on a plate some of them generally trail slightly. Trails of this nature if not too faint can be measured as reliably as disk images. An annunciator clock operating an electric buzzer once per minute gives the signal for a new micrometer setting.

The value of one revolution of the micrometer screw is taken as $15''.3$. The head formerly had 100 divisions, but to facilitate mental subdivision of the scale while observing and to secure better scale values, a larger micrometer head with 120 divisions has been provided. A power of 400 is generally used in guiding. One of the original set of eyepieces was for some time employed, but later a Steinheil orthoscopic ocular of the power 400 was secured having a much better field and definition.

At the end of an exposure the driving clock is usually stopped while the lens shutters remain open. Diurnal motion then produces photographic trails of the brighter stars in the field. These trails, of considerable length, are generally given about a minute exposure. They indicate for convenience the orientation of the plate. In position reductions the orientation correction is derived from the formula.

Ordinarily 12.5 magnitude asteroids were the limit observable with the 6-inch Dallmeyer lenses. At times the 13th magnitude could be attained, but only under most favorable atmospheric conditions and near the zenith. For position work the comparatively short focal length of these lenses was a disadvantage since they gave but a small scale value. Photographic fog on the plates due to type of lens and sky glare from the city illumination was often conspicuous.

The twin 10-inch triple objectives of 113 inches focus.—In 1910 Mr. PETERS, in charge of this equatorial, proposed the construction of a more powerful pair of photographic lenses for the telescope.[1] These lenses he offered to grind, polish,

[1] See article entitled "The Photographic Telescope of the U. S. Naval Observatory; On the Construction of a Pair of Triple Objectives: Their Use in Celestial Photography; Together with a few Reminiscences," Popular Astronomy, Vol. XXVII, No. 6, p. 349.

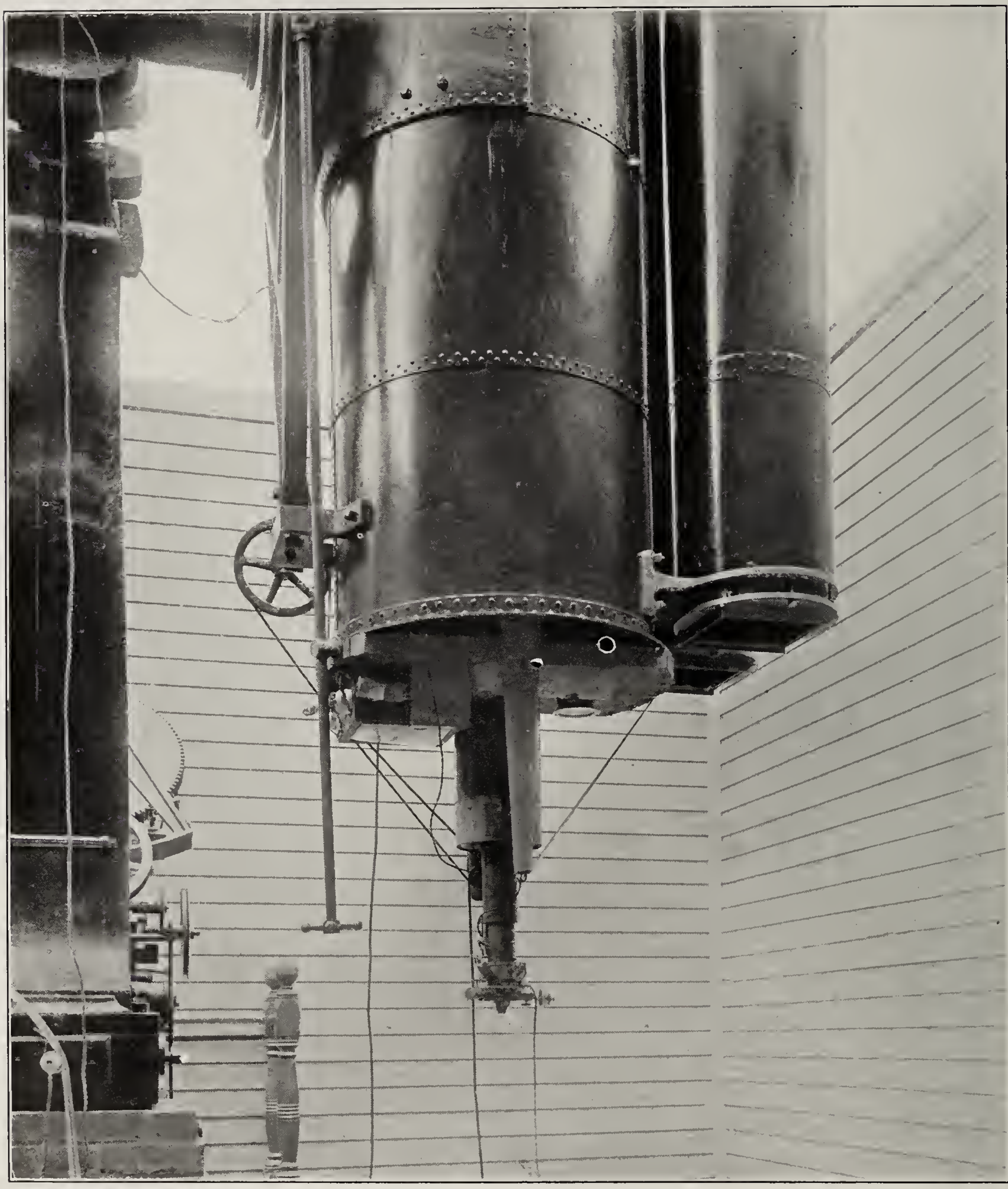
and figure at the Naval Observatory. Objectives of 10 inches aperture were agreed upon, as this was the largest size deemed feasible, and the Cooke stellar type was selected as being economical in construction. Optically, also, this was considered better than the doublet type for the purpose intended. In this Cooke combination the errors of two positive lenses of crown glass are corrected by a negative flint glass element between them. The elements ordinarily have considerable separation. Jena glass by Schott & Genossen was the material selected. This glass was furnished in disks, together with samples for making testing prisms, directly from the makers and has proved eminently satisfactory. Mr. E. D. Tillyer, formerly a member of the observatory staff, now with the American Optical Co., computed the figures of the lenses. The lens mounts, together with auxiliary parts composing the twin cameras, were from Mr. Peter's designs and embodied some novel features. They were constructed at the Washington Navy Yard. With the exception of the camera tubes, which are of galvanized sheet iron, the entire construction is of brass.

Knowing the constants of the lenses with precision, the mounts were completed and the several lenses fitted to their respective cells before polishing. The edge of each lens is ground as if it were the section of a sphere formed by passing parallel planes through the sphere at equal distances from the center. This form of edge enables any element to be removed easily from its cell for cleaning without disturbing the collimation adjustments. About 0.005 of an inch was allowed for clearance of each lens in its cell. This makes for rigidity of the system but allows for thermal changes over the necessary range.

The equivalent focal length of each of these 10-inch triple lenses is approximately 113 inches. This factor depends upon the separation of the elements in each objective. Thus the objectives may be considered as capable of focal variation over a slight range, although each of the corresponding duplicate lens surfaces was ground and polished consecutively upon the same tool. In this construction, if all the elements were in contact practically no refraction would take place in the system as a whole. The converging power of the system, and also the correction of optical refractive errors of the elements, depend upon their separations. To facilitate adjustment of observed optical errors, a table of differential coefficients is given which has proved extremely valuable for refined adjustments. The table indicates the effect of observed optical errors of the system as a whole which correspond to numerical changes of position of either or both positive lenses with respect to the negative lens.

Table I.—*Differential Coefficients, 10-inch Triple Objectives*

	ds_1	ds_2	Signs
Back focus	−4. 86	−1. 11	− = Back focus nearer objective.
Spherical aberration	−0. 22	−0. 14	− = Spherical aberration given by a positive lens.
Coma at 7 inches radius	+0. 005	−0. 006	− = Coma inward.
Secant, curvature of field	−0. 011	+0. 012	− = Curvature of field is concave toward objective.



THE 10-INCH PHOTOGRAPHIC EQUATORIAL

Below are given the constants of these lenses as follows:

TABLE II.—*Constants of Glass Employed*

		Catalogue No.	μ_D	$\frac{n-1}{\Delta_n}$
Element 1	Crown	Jena 0. 3453	1. 5191	60. 4
Element 2	Ordinary flint	Jena 0. 318	1. 6129	36. 9
Element 3	Crown	Jena 0. 3453	1. 5191	60. 4

TABLE III.—*Radii of Curvature, Thickness of Elements, and Separations*

$$E_1\begin{cases} R_1 = +\ \ 27.60 \text{ inches} \\ R_2 = +629.50 \text{ inches} \end{cases} t_1 = 1.300 \text{ inches} \qquad s_1 = 13.740 \text{ inches}$$

$$E_2\begin{cases} R_3 = -\ \ 35.42 \text{ inches} \\ R_4 = -\ \ 25.75 \text{ inches} \end{cases} t_2 = 0.500 \text{ inches} \qquad s_2 = 12.790 \text{ inches}$$

$$E_3\begin{cases} R_5 = +147.80 \text{ inches} \\ R_6 = +\ \ 28.36 \text{ inches} \end{cases} t_3 = 1.000 \text{ inches}$$

Should the construction of a similar type objective be again undertaken, a less dense flint glass element would probably be employed. This would reduce the separations of the lenses, giving better field corrections.

Extreme difficulty was experienced in adjusting these lenses for collimation and separation. When assembled, tests for figure by the Foucault method were made. A 10-inch plane silvered mirror from the Brashear coelostat placed in front of the objective was used in this connection. Light from a pinhole with a Nernst lamp as source at the equivalent focal plane thus traversed the lens system twice. A disk of blue glass was also used to cut out light except the actinic rays for which these objectives are corrected. This knife-edge test is very delicate.[1] It brings out in relief errors of optical surface or refractive errors for rays converging at a focus. Nearly perfect surfaces were found for each element.

After assembling this new photographic equipment on the telescope mounting preliminary collimation adjustments for each objective system were attempted by eye observations. A small electric light bulb was used as a source. The numerous reflections from the lens surfaces were observed for alignment both from in front of the lenses and from near the focal plane. Final adjustments were made using out of focus stellar images to detect errors. For collimation the cell of each element is equipped with three adjusting screws; also these screws permit a slight adjustment for the separations of the lens elements. In addition, the middle or negative lens cell of each combination has a screw-actuated transverse motion to allow for centering the system as a whole. For access to this transverse adjustment circular

[1] For a description of this test see Smithsonian Contributions to Knowledge, Vol. XXXIV; Monographs by DRAPER and by RITCHEY.

apertures in the objective tubes are provided, which are covered by screw caps when not in use. One of these 10-inch photographic objectives has slightly better definition than the other.[1] Although results from either lens can be used for position measurement, the negatives from the better lens are generally employed.

A triple objective of the type described has several optical advantages over the so-called doublet construction. The absence of one flint-glass element, with its accompanying light absorption and two additional reflecting surfaces, gives greater speed to the triple lens for a given aperture and focal length. In the triplet the middle or negative lens is smaller in diameter than either the front or back lens. The pupil point is near this middle lens. Owing to its limiting diaphragm, much extraneous light is prevented from entering the cameras. This makes for a darker sky background. Compared with the doublet, wider field corrections of good definition are possible in the triplet form.

Eastman Universal Laboratory Outfit plate holders, 8 by 10 inches, are used in observing. These are single holders of wood, extremely well made, and convenient in manipulation. With the 10-inch photographic objectives of 113 inches focal length and plates of this size a field of about 4° by 5° is covered. At the focus, therefore, 1° corresponds approximately to 2 inches, or to about 50 mm.

The driving clock.—In the adaptation of the old 26-inch equatorial mounting to photography, the original Clark driving clock was at first installed. While performing well at times, it would not do so continuously, and its uncertain functioning caused much eye fatigue to the observer and rendered guiding less accurate.

At the old Naval Observatory the driving weight of this clock had been wound by a water motor. After a fall of some distance the weight was automatically rewound. In the belt system, between the driving weight and the conical pendulum, a Huyghens loop was employed. Through oscillations of the pendulum rate control was effected by an electric brake operating on the rim of a large brass fly wheel. In the new installation the driving weight of this clock was wound by an alternating current motor of one-sixth horsepower. After reaching a certain height the weight was kept at a nearly constant elevation. While the clock was operating, a switch, which opened and closed automatically by the weight, gave motor control. Besides these changes and shortening the vertical driving rod from the clock to the gears operating the worm screw and sector, no other important modifications were made in this system.

With the new 10-inch triple objectives the need of a more powerful and accurate driving clock for the photographic equatorial became increasingly evident. Small guiding errors become apparent on photographs with lenses of 113 inches focal length. To remedy this condition, a new electric driving clock based upon somewhat novel principles was designed by Mr. PETERS.[2] Acknowledgment is also due to Mr. J. RHEINBOLD, foreman of the nautical instrument repair shop at the Naval Observatory, for many refined details introduced during construction.

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[1] As now mounted on the telescope the better objective can be designated as the upper one, with the telescope on the west side of the pier and pointed south.

[2] A detailed description of this electric driving clock was published in Popular Astronomy, Vol. XXX, Feb., 1922.

THE ELECTRIC DRIVING CLOCK OF THE PHOTOGRAPHIC EQUATORIAL

The cast-iron base, some of the gear wheels, and the motor were utilized from the old clock. This new driving clock is a great improvement over the former one.

The mechanical principle of this clock depends upon the synchronism of its alternating-current motor with the alternating current furnished by a commercial power plant. Consequently the clock motor, steadied by a 20-pound bronze fly-wheel, tends to keep in step with the generator. Variations of phase and voltage on the power line take place but slowly and through but a narrowly restricted range. The rate effect of these variations on the worm wheel and sector operating the telescope's polar axis is much reduced by the clock train gears. The clock gearing is arranged for the motor to drive a trifle fast. This excess rate is then reduced to the proper speed by a make-and-break switch in the motor circuit operated mechanically by the clock itself. While the current to the motor is off during the break, the motor tends to slow down. This control is automatic and can be changed when necessary to secure the proper clock rating. Rate changes are effected by a movable cam wheel operated by a revolving lifter plate with a variable arc of travel on the radius. This cam wheel is adjustable by its carriage on a radial lifting arm and with the clock operating makes and breaks the circuit to the motor through the automatic switch. When this carriage is farthest out on the arm, the clock rate is fastest. A variable rheostat in the motor circuit affords additional fine adjustment of clock rate. Other details include a shunt circuit through the motor to prevent "bunt." Also a direct short-circuit switch is provided for convenient starting, which may be cut out by hand afterwards. The clock is then operated and controlled by the make-and-break circuit.

A clutch has been provided at the base of the upright driving rod between the clock and the gears on the harp-shaped equatorial head. The telescope can thus be thrown into or out of gear while the clock is operating. This arrangement is especially useful to end an exposure where diurnal star trails are required. It is also quickly available should the sector run out.

The required clock rate is determined by observing the guiding star in the field of the guiding telescope for a few moments. Easy adjustments are thus available for guiding upon any ordinary asteroid motion.

Originally plans were made to control this electric clock by an auxiliary pendulum clock, but from experience this additional control was found to be unnecessary.

The Stackpole measuring engine.—Positions of asteroids here published were measured with the Stackpole measuring engine. This instrument has also been designated as the "Ruled glass scale comparator" in some of the observatory publications. It was purchased by the transit of Venus commission for measuring photographs of the transits of 1874 and 1882 and has also been used to investigate the screws of several of the micrometers at the Naval Observatory and for other similar purposes.

For many years this engine was mounted on a substantial wooden table, but as no regular measuring room had been provided it was used in different locations. An addition to the photographic house was erected later in which this engine was mounted upon a brick pier independent of the floor of the building. Here most of the asteroid plates were measured.

Plates 8 by 10 inches, which were used with the 10-inch triple lenses, are the largest which can be measured by the engine. At times plates of this size require decentering somewhat on the leveling table to bring all comparison stars within the range of the run of the microscopes and the ruled glass scales. The leveling table of the engine is of plate glass resting upon three point supports, with fine leveling screw adjustments. Leveling is performed by observing star images or plate grain over various parts of the negatives. An inclined mirror beneath the leveling table provides for plate illumination, and its position is never disturbed while measuring a plate.

The leveling table with its position circle is capable of rotation by hand or by a tangent screw and can be clamped in place. By this means plates are approximately oriented by diurnal star trails, usually obtained upon the negatives. Settings in α and δ are then made on the asteroid and comparison star images with the wires of the observing microscope of the engine. These wires consist of a single fixed wire, generally used in the δ measures, for bisecting the star and asteroid images, and a pair of close parallel wires for measures in α. It is found that the parallel wires are more convenient for measuring positions of short star trails than a single wire. The asteroid image, generally small, is usually measured in α in the space between the pair of wires, but occasionally a series of settings is made by bisecting the asteroid image with each of the parallel wires.

The positions as given by the settings of the observing microscope are read in each coordinate by an auxiliary microscope upon a finely divided ruled glass scale. Ruled glass reticule scales in the focus of the eyepieces of each reading microscope subdivide the whole divisions of the ruled glass scales.

Whole numbers of divisions corresponding to the settings on the ruled glass scales are read by single lens microscopes from auxiliary silver scales.

Daylight is used for the illumination of the plates under measurement and for lighting the microscope reticules and the ruled glass scales. In some cases total reflecting prisms have been found convenient as well as finely ground glass diffusing screens. The windows of the measuring room are furnished with ground glass in the lower sashes for light diffusion. Generally the positions depend upon the mean of five settings in each coordinate, but when discrepancies were apparent additional measures were introduced. The plate measures are published in this volume.

Through the courtesy of Dr. Fritz Cohn, Director of the Rechen-Institut, the Naval Observatory was allotted zones 4° wide within which to make asteroid observations as follows:

+ 4° to + 8° March, April, September, October.
+ 0° to + 4° May to August, inclusive.
+12° to +16° November to February, inclusive.

Discussion of the observations of asteroids made with the 10-inch photographic equatorial.—The observations made with the 10-inch photographic equatorial have been assembled in this volume covering the period October 1, 1912, to April 8, 1924.

As already noted, a number of photographic observations of asteroids were taken previous to 1912, but they have not been included in this group since they were intended primarily for finding purposes only. They were obtained with a camera having a 6-inch Dallmeyer portrait lens attached to the tube of the 26-inch

equatorial or with the photographic equatorial carrying a pair of 6-inch Dallmeyer lenses. When these early observations were published in the journals, they appeared as corrections to the ephemerides or as approximate positions. (See *Astronomische Nachrichten*, Vol. 167, p. 79; Vol. 173, p. 11; Vol. 176, p. 121, and *Astronomical Journal*, Vol. 23, pp. 92, 103; Vol. 24, p. 106.)

While a few have not been published, the major portion of the observations made since 1912 with the 10-inch photographic equatorial have been published in the *Astronomical Journal* from time to time. (See *Astronomical Journal*, Vol. 29, pp. 61, 147; Vol. 30, pp. 49, 178, 201; Vol. 31, pp. 65, 72, 95; Vol. 32, pp. 60, 97; Vol. 34, pp. 11, 199; Vol. 35, pp. 52, 149, 184.)

The series of observations has been carefully examined and checked from the original measures by Miss Eleanor A. Lamson and the assistants in the computing section. A number of asteroid plates hitherto unmeasured, generally due to unavailable catalogue places for the reference stars at the time of observation, have been measured and reduced by Miss Lamson. In some cases plates have been remeasured using later and better star positions, and where corrections for proper motion have been obtainable they have been applied to the star places. In this the *Eigenbewegungs-Lexikon* of R. Schorr has been most useful. The *Astronomische Gesellschaft Catalogues,* for the reference stars, have been used generally though in the later work the positions have frequently been taken from the several *Astrographic Catalogues, Cordoba Zone Catalogue (1900), or Boss's Preliminary General Catalogue.* Newcomb's value of the precessional constant has been used in reducing the catalogue positions to the desired epoch. The name of the catalogue used, together with the number of each reference star, appears in the list of asteroid observations.

After the observations had been checked they were compared with published ephemerides or with computed extensions of these ephemerides by Miss Lamson. Where no ephemeris was available, comparison was made with published observations. By this means the identification has been made possible. The ephemerides used were taken from the following publications:

B. J. = Berliner Astronomisches Jahrbuch.
O. E. = Oppositions-Ephemeriden (Rechen-Institut).
O. M. = Ephemeride de l'Observatoire de Marseille.
E. Z. = Ephemeriden-Zirkular der Astronomischen Nachrichten.
B. Z. = Beobachtungs-Zirkular der Astronomischen Nachrichten.
A. N. = Astronomische Nachrichten.
A. J. = Astronomical Journal.

The corrections to the ephemerides are given in the column $(O-C)$ of the list of observations. It will be noticed that in the early years the right ascensions and declinations of the asteroids are given for the beginning of the year of observation, no account, however, being taken of the mean place reduction. In the later years the epoch 1925.0 has been similarly used. This is called the "Astrographic Position," and the epoch appears at the head of the columns of right ascension and declination. As a result of the application of the corrections for proper motion to the reference stars, of the usage of new star places, and of remeasures of asteroid plates these final adopted positions differ somewhat from the positions

published in the *Astronomical Journal*. In many cases the differences are very slight, but when they become appreciable they have been listed in the Errata.

Two methods have been used in reducing the plate measures to right ascension and declination. The first method, which has been used for about three-fourths of the observations follows. A solution was made using two stars, well situated with respect to the asteroid, and the asteroid. If more than two stars could be obtained, a second solution was made using a new grouping. At times it was possible to make as many as four such solutions although three was the general rule. The position of the asteroid was taken as the mean of the several solutions. The formulae follow:

Let

$\alpha_1, \alpha_2 \ldots$ = the right ascensions of the stars.
α_o = the right ascension of the asteroid.
$\delta_1, \delta_2 \ldots$ = the declinations of the stars.
δ_o = the declination of the asteroid.
s = the distance between star_1 and star_2.
δ_m = the mean declination of star_1 and star_2.
σ = the scale value or reseau.
X_1, Y_1 = the rectangular coordinates of a star.
X_o, Y_o = the rectangular coordinates of the asteroid.

Then

$$s \sin \varphi = \delta_2 - \delta_1$$
$$s \cos \varphi = (\alpha_2 - \alpha_1) \cos \tfrac{1}{2} (\delta_2 + \delta_1)$$

and

$$\zeta \sin (\varphi - \lambda) = \Delta Y_*$$
$$\zeta \cos (\varphi - \lambda) = \Delta X_*$$

where

$$\sigma = \frac{s}{\zeta}$$

and

$$\Delta X_* = (X_2 - X_1)$$
$$\Delta Y_* = (Y_2 - Y_1)$$

Let

$$\Delta X_o = (X_o - X_*)$$
$$\Delta Y_o = (Y_o - Y_*)$$

Then

$$\left.\begin{aligned} (O - *)_\alpha &= \tfrac{1}{15}\, \sigma(\Delta X_o \cos \lambda - \Delta Y_o \sin \lambda) \sec \delta_m \\ (O - *)_\delta &= \sigma(\Delta X_o \sin \lambda + \Delta Y_o \cos \lambda) \end{aligned}\right\} \text{------------ (1)}$$

The second method used in reducing the plate measures to right ascension and declination follows:

Five or more reference stars, corrected for proper motion, well grouped about the asteroid, were selected and their positions reduced to the epoch 1925.0. They were corrected for second order terms using the method of Fabritius, $\Delta\alpha$ and $\Delta\delta$ being obtained by differencing each star with the guiding star of the plate.

$$\left.\begin{aligned} X &= \Delta\alpha + \Delta\alpha\Delta\delta\ [4.6856_n] \tan \delta_{G.S.} \\ Y &= \Delta\delta + \Delta\alpha^2\ [6.7367]\ \sin \delta_{G.S.} \cos \delta_{G.S.} \end{aligned}\right\} \text{------------ (2)}$$

The differences between these values and the centroid of the star group or $(X - X_c)$ and $(Y - Y_c)$ were then obtained. These, in turn, were combined with the differences between the rectangular coordinates measured on the plates of the same stars and the centroid of the star group or $(x - x_c)$ and $(y - y_c)$ in equations of condition of the form,

$$\left.\begin{aligned} a\ (x - x_c) + b\ (y - y_c) &= X - X_c = n \\ c\ (x - x_c) + d\ (y - y_c) &= Y - Y_c = v \end{aligned}\right\} \text{------------ (3)}$$

Solving by least squares the values of the coefficients a, b, c, and d were obtained which were substituted back in the equations of condition, thus serving as a check. Treating the asteroid as a star, by substitution in equations (3), the values of (X_o-X_c) and (Y_o-Y_c) were obtained, which give the position of the asteroid with reference to the guiding star of the plate.

The following table shows the asteroids observed, 270 in all, the opposition at which they were observed, and the number of observations at each opposition:

Name	Opposition	Number Obsn.	Name	Opposition	Number Obsn.
(3) Juno	1922	2	(78) Diana	1916	2
(5) Astraea	1915	2		1918	1
(10) Hygiea	1923	2	(81) Terpsichore	1922	2
(12) Victoria	1916	2	(84) Klio	1918	2
(16) Psyche	1919	1	(85) Io	1917	2
(17) Thetis	1916	2	(86) Semele	1917	2
(18) Melpomene	1917	2	(88) Thisbe	1917	2
(24) Themis	1917	2	(90) Antiope	1912	3
(25) Phocaea	1917	2	(91) Aegina	1918	2
(26) Proserpina	1915	2		1920	2
	1922	1	(92) Undina	1917	2
(29) Amphitrite	1917	2		1919	2
	1921	2	(93) Minerva	1922	2
	1923	2	(94) Aurora	1923	2
(30) Urania	1918	1	(96) Aegle	1916	1
	1919	2	(97) Klotho	1916	1
(32) Pomona	1912	4	(100) Hekate	1918	2
	1916	2	(101) Helena	1922	2
	1918	1	(103) Hera	1922	2
(33) Polyhymnia	1922	2	(110) Lydia	1917	2
(34) Circe	1916	2	(115) Thyra	1917	2
(37) Fides	1917	2	(116) Sirona	1922	2
(38) Leda	1922	2	(119) Althaea	1915	2
(39) Laetitia	1916	2		1917	2
(41) Daphne	1916	1	(121) Hermione	1916	3
	1921	2	(122) Gerda	1916	2
(49) Pales	1917	1		1917	4
(50) Virginia	1922	2	(123) Brunhild	1921	2
(51) Nemausa	1916	1		1923	2
(52) Europa	1923	2	(124) Alkeste	1915	2
(57) Mnemosyne	1915	3	(125) Liberatrix	1918	2
(58) Concordia	1917	2	(126) Velleda	1914	1
	1922	2		1916	1
(59) Elpis	1916	1	(127) Johanna	1920	2
(60) Echo	1916	2	(128) Nemesis	1915	2
(61) Danaë	1922	2		1920	2
(62) Erato	1921	2	(129) Antigone	1917	2
	1923	2	(130) Elektra	1917	2
(64) Angelina	1918	1	(131) Vala	1916	1
(65) Cybele	1915	2	(132) Aethra	1922–1923	26
	1918	2	(133) Cyrene	1916	2
(67) Asia	1915–1916	2	(135) Hertha	1923	2
	1920	2	(136) Austria	1920	2
	1922	2	(138) Tolosa	1917	2
(69) Hesperia	1915	2		1923	2
(70) Panopaea	1917	2	(140) Siwa	1915	2
	1920	2	(142) Polana	1922	2
(72) Feronia	1920	2	(145) Adeona	1916	2

Name	Opposition	Number Obsn.	Name	Opposition	Number Obsn.
(147) Protogeneia	1915	2	(259) Aletheia	1916	2
(148) Gallia	1916	1	(260) Huberta	1915	2
(149) Medusa	1917	2	(261) Prymno	1920	2
	1920	1	(268) Adorea	1916	2
(153) Hilda	1922	2		1922	2
(158) Koronis	1920	2	(270) Anahita	1915	3
	1923	2	(275) Sapientia	1923	2
(160) Una	1921	2	(276) Adelheid	1916	2
(161) Athor	1914	1		1918	2
	1921	2		1922	1
(162) Laurentia	1923	2	(277) Elvira	1919	4
(163) Erigone	1919	2	(279) Thule	1915	2
	1923	2	(287) Nephthys	1920	2
(167) Urda	1915	4	(289) Nenetta	1922	2
(168) Sibylla	1922	2	(302) Clarissa	1920	2
(169) Zelia	1918	2	(303) Josephina	1916	2
(173) Ino	1917	2	(305) Gordonia	1916	2
(176) Iduna	1921	3	(306) Unitas	1916	2
(177) Irma	1923	2	(308) Polyxo	1916	2
(180) Garumna	1921	2		1918	2
(184) Dejopeja	1915	2		1919	2
	1918	3	(312) Pierretta	1922	1
(189) Phthia	1920	2	(322) Phaeo	1916	1
	1922	2	(323) Brucia	1923	9
(191) Kolga	1915	2	(331) Etheridgea	1915	2
(194) Prokne	1917	2		1923	1
(195) Eurykleia	1920	2	(334) Chicago	1916	5
(196) Philomela	1923	2	(335) Roberta	1916	2
(198) Ampella	1918	1		1922	2
(199) Byblis	1915	1	(339) Dorothea	1916	1
(200) Dynamene	1920	2	(340) Eduarda	1915	2
(201) Penelope	1916	2	(341) California	1915	2
	1917	2	(342) Endymion	1918	2
(206) Hersilia	1919	3	(344) Desiderata	1917	3
	1922	2	(345) Tercidina	1920	2
(208) Lacrimosa	1923	2	(352) Gisela	1916	2
(211) Isolda	1921	4	(357) Ninina	1922	2
(213) Lilaea	1917	2	(358) Apollonia	1917	2
	1921	2	(361) Bononia	1914	1
(214) Aschera	1918	2	(363) Padua	1916	3
(219) Thusnelda	1916	2	(364) Isara	1923	1
(225) Henrietta	1915	2	(367) Amicitia	1914	2
(230) Athamantis	1915	2	(368) Haidea	1921	4
(232) Russia	1920	2	(371) Bohemia	1916	2
(233) Asterope	1915	2	(374) Burgundia	1916	2
(234) Barbara	1915	2		1921	4
	1916	2	(375) Ursula	1918	2
(236) Honoria	1916	2	(376) Geometria	1916	1
(239) Adrastea	1915	4	(377) Campania	1915	7
	1922	2	(378) Holmia	1916	2
(240) Vanadis	1919	1	(379) Hucnna	1919	3
(241) Germania	1916	2	(380) Fiducia	1917	2
(242) Kriemhild	1917	2	(382) Dodona	1914	1
(245) Vera	1916	11	(384) Burdigala	1914	1
(248) Lameia	1921	2	(385) Ilmatar	1918	1
(250) Bettina	1916	4		1920	1
(257) Silesia	1916	2	(387) Aquitania	1915–1916	2
(258) Tyche	1921	2	(388) Charybdis	1912	3

Name	Opposition	Number Obsn.	Name	Opposition	Number Obsn.
(393) Lampetia	1917	2	(551) Ortrud	1916	2
(401) Ottilia	1916	2	(556) Phyllis	1915	2
(402) Chloë	1919	2	(565) Marbachia	1922	2
(403) Cyane	1915	1	(569) Misa	1920	2
(407) Arachne	1916	2	(572) Rebekka	1916	2
(409) Aspasia	1916	2	(584) Semiramis	1917	2
(413) Edburga	1923	9	(595) Polyxena	1914	1
(415) Palatia	1919	2	(600) Musa	1918	2
(416) Vaticana	1921	2		1922	2
(418) Alemannia	1923	2	(601) Nerthus	1916	1
(419) Aurelia	1917	2	(619) Triberga	1914	1
(420) Bertholda	1915	3	(628) Christine	1920	2
(425) Cornelia	1915	2	(631) Philippina	1923	2
(429) Lotis	1918	2	(637) Chrysothemis	1921	2
(433) Eros	1921	4	(659) Nestor	1914	1
(440) Theodora	1916	1	(694) Ekard	1922	2
(441) Bathilde	1916	2	(696) Leonora	1914	1
(442) Eichsfeldia	1917	2	(703) Noëmi	1923	1
(446) Aeternitas	1916	2	(709) Fringilla	1914	2
(447) Valentine	1917	2	(712) Boliviana	1914	1
(451) Patientia	1915	2	(714) Ulula	1916	1
(455) Bruchsalia	1917	2	(723) Hammonia	1916	2
(465) Alekto	1923	2	(727) Nipponia	1916	2
(466) Tisiphone	1913	3	(729) Watsonia	1922	2
(468) Lina	1921	2	(731) Sorga	1914	2
(469) Argentina	1915	2	(733) Mocia	1915	2
(471) Papagena	1922	1	(734) Benda	1923	2
(479) Caprera	1916	1	(738) Alagasta	1922	2
(483) Seppina	1917	2	(742) [1913 Q U]	1916	2
	1922	2	(743) [1913 Q V]	1922	2
(485) Genua	1917	3	(752) Sulamitis	1917	1
	1922	2	(754) Malabar	1921	2
(487) Venetia	1919	2	(762) Pulcova	1914	1
(489) Comacina	1917	2	(764) [1913 S U]	1915	1
	1923	2	(766) [1913 S W]	1915	2
(490) Veritas	1916	1	(769) Tatiana	1914–1915	3
(494) Virtus	1915	2	(773) [1913 T V]	1915	3
(497) Iva	1913	1	(779) Nina	1915	2
(498) Tokio	1915	3	(785) Zwetana	1916	2
(503) Evelyn	1915	2	(787) Moskva	1915	2
(518) Halawe	1915	2		1919	10
	1923	2	(792) Metcalfia	1917	2
(519) Sylvania	1917	2	(797) Montana	1916	2
(526) Jena	1920	2	(860) Ursina	1922	2
(530) Turandot	1915	2	(886) Washingtonia	1917–1918	8
(532) Herculina	1916	3		1919	3
(535) Montague	1922	2		1923	2
(536) Merapi	1915	5	(906) Repsolda	1923	2
	1916	2	(915) Cosetta	1921	4
	1917	4	(925) Alphonsina	1920	3
	1919	3		1922	2
	1921	1	(945) Barcelona	1921	4
	1922	3	(980) Anacostia	1921–1922	13
	1923	3		1922–1923	5
(538) Friederike	1916	2		1924	2
(540) Rosamunde	1918	2	(1028) [1923 P G]	1923	3
	1921	4	[1915 Y J]	1915	3
(542) Susanna	1916	2	Asteroid	1915	2
(546) Herodias	1923	2	[1916 B A]	1916	1

PLATE MEASURES OF ASTEROIDS

[The Astronomische Gesellschaft Catalogue positions used for the comparison stars unless otherwise indicated]

Name	Date	Catalogue	Measures	
			x	y
(3) Juno	1922 Sept. 26	Asteroid	202.574	157.552
		Albany 1021	150.037	148.453
		Albany 1027 Leipzig II 1315	182.989	181.671
		Leipzig II 1317	195.069	217.205
		Albany 1033 Leipzig II 1326	226.650	181.682
		Albany 1038	242.685	138.472
		Albany 1040	247.275	136.660
	27	Asteroid	210.958	130.775
		Albany 1027 Leipzig II 1315	182.550	171.124
		Albany 1033 Leipzig II 1326	226.242	171.209
		Albany 1036	232.764	86.451
		Albany 1038	242.326	127.992
		Albany 1040	246.896	126.200
(5) Astraea	1915 Nov. 3	Asteroid	255.289	202.804
		Albany 503	234.214	211.850
		Albany 507	258.103	143.337
		Albany 510	275.749	212.303
	5	Asteroid	284.792	263.042
		Albany 494	251.410	278.333
		Albany 498	269.562	267.382
		Albany 503	304.676	286.496
(10) Hygiea	1923 Sept. 10	Asteroid	114.402	169.252
		Straszburg 7826	98.949	181.579
		Straszburg 7828	108.900	178.654
		Straszburg 7830	126.653	148.625
		Straszburg 7831	129.552	108.015
		Straszburg 7834	140.404	198.601
		Straszburg 7842	161.452	198.778
	17	Asteroid	138.201	185.152
		Straszburg 7810	122.494	223.850
		Straszburg 7812	146.254	142.775
		Straszburg 7813	155.502	206.554
		Straszburg 7817	173.629	148.205
		Straszburg 7818	184.526	175.126
(12) Victoria	1916 Jan. 2	Asteroid	208.106	238.214
		Leipzig I 2463	187.765	230.163
		Leipzig I 2468	190.653	189.756
		Leipzig I 2476	210.246	258.056
	7	Asteroid	229.124	199.771
		Leipzig I 2401	197.498	186.880
		Leipzig I 2406	210.370	251.446
		Leipzig I 2424	244.769	179.935
(16) Psyche	1919 July 25	Asteroid	185.072	214.873
		Washington 7774	149.174	179.935
		Washington 7782	185.062	220.650
		Washington 7789	200.131	165.143
(17) Thetis	1916 Dec. 2	Asteroid	96.848	231.673
		Leipzig I 1356	62.101	202.549
		Berlin A 1275	99.099	266.776
		Leipzig I 1368	139.034	182.892
	22	Asteroid	121.954	204.773
		Leipzig I 1277	90.916	192.287
		Leipzig I 1278	93.298	206.379
		Leipzig I 1285	127.195	177.002
(18) Melpomene	1917 Mar. 22	Asteroid	237.728	197.671
		Leipzig I 4237	187.060	215.499
		Leipzig I 4239	202.352	219.181
		Leipzig I 4257	278.890	184.675
	24	Asteroid	185.402	174.958
		Leipzig I 4233	144.506	163.044
		Leipzig I 4237	172.367	168.551
		Leipzig I 4239	187.594	172.477

Name	Date	Catalogue	Measures	
			x	y
(24) Themis	1917 Oct. 11	Asteroid	104.204	129.529
		Leipzig II 409	60.362	168.523
		Leipzig II 415	100.702	167.255
		Leipzig II 429	153.952	95.975
	14	Asteroid	221.118	197.181
		Leipzig II 403	180.685	174.760
		Leipzig II 409	232.322	257.503
		Leipzig II 415	272.670	256.148
(25) Phocaea	1917 Nov. 16	Asteroid	42.361	137.723
		Leipzig II 991	28.501	121.302
		Leipzig II 994	46.307	171.324
		Leipzig II 997	47.719	82.520
	17	Asteroid	56.400	91.248
		Leipzig II 988	47.102	77.199
		Leipzig II 991	62.058	93.057
		Leipzig II 994	79.631	143.203
(26) Proserpina	1915 Oct. 25	Asteroid	224.752	170.789
		Albany 298	229.570	202.445
		Albany 299	230.548	192.498
		Albany 301	239.166	142.450
	27	Asteroid	187.767	229.304
		Albany 279	164.803	267.418
		Albany 294	216.389	201.683
		Albany 301	242.502	212.672
	1922 Mar. 25	Asteroid	145.313	124.757
		Albany 4418	117.968	75.299
		Albany 4421	128.381	132.139
		Albany 4423	146.628	154.229
		Albany 4433	195.935	101.713
(29) Amphitrite	1917 Oct. 16	Asteroid	104.196	274.699
		Berlin A 494	70.541	322.257
		Berlin A 498	94.896	244.466
		Berlin A 513	161.883	316.616
	17	Asteroid	128.394	305.176
		Berlin A 481	42.264	303.150
		Berlin A 487	57.477	306.449
		Berlin A 498	142.166	278.628
	1921 Oct. 5	Asteroid	236.247	66.635
		Leipzig II 372	300.309	103.350
		Leipzig II 376	295.418	102.623
		Leipzig I 306	169.687	51.139
		Leipzig I 308	166.824	47.751
	8	Asteroid	111.439	108.097
		Leipzig II 347	61.317	105.658
		Leipzig I 265	75.995	168.215
		Leipzig II 376	120.204	85.386
	1923 Mar. 14	Asteroid	104.606	157.588
		Berlin A 4013	72.192	154.397
		Berlin A 4021	86.373	170.402
		Berlin A 4022	86.786	100.752
		Berlin A 4028	142.023	130.800
		Berlin A 4032	157.911	190.695
	17	Asteroid	179.099	170.298
		Berlin A 3995	105.384	150.518
		Berlin A 4001	144.811	116.700
		Berlin A 4004	160.517	212.199
		Berlin A 4008	179.350	193.155
		Berlin A 4013	195.499	163.199
		Berlin A 4021	209.394	179.345
(30) Urania	1918 Feb. 11	Asteroid	257.044	42.501
		Leipzig I 3901	253.669	147.699
		Leipzig I 3912	283.056	52.303
		Leipzig I 3915	299.321	69.049

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Name	Date	Catalogue	Measures x	Measures y
(30) Urania (Contd.)	1919 June 16	Asteroid	175.766	179.970
		Cordoba 11418 [1]	120.295	194.184
		Cordoba 11430	159.470	126.414
		Cordoba 11433	170.748	172.233
		Cordoba 11437	173.562	227.046
		Cordoba 11451	220.685	171.869
		Cordoba 11453	226.859	169.819
	21	Asteroid	165.919	208.704
		Cordoba 11389 [1]	125.229	196.755
		Cordoba 11396	150.165	235.794
		Cordoba 11400	165.013	178.994
		Cordoba 11416	205.083	224.679
		Cordoba 11418	208.181	196.842
(32) Pomona	1912 Oct. 1	Asteroid	303.616	299.967
		Leipzig II 317	289.823	329.886
		Leipzig II 318	292.833	280.524
	4	Asteroid	260.444	284.996
		Leipzig II 302	225.899	274.148
		Leipzig II 318	309.793	298.031
	5	Asteroid	208.716	308.913
		Leipzig II 302	223.037	308.556
		Leipzig II 318	138.921	286.035
	7	Asteroid	268.681	296.189
		Leipzig II 278	225.234	314.550
		Leipzig II 282	231.523	285.399
		Leipzig II 302	294.753	318.150
	1916 Sept. 23	Asteroid	164.854	134.541
		Albany 8186	138.902	103.949
		Albany 8190	154.148	172.772
		Albany 8194	172.383	94.041
	25	Asteroid	129.962	197.178
		Albany 8177	105.899	144.179
		Albany 8178	111.115	148.796
		Albany 8186	142.917	188.666
	1918 Jan. 19	Asteroid	253.077	214.706
		Berlin A 1954	237.738	207.290
		Berlin A 1966	256.015	200.589
		Berlin A 1967	257.951	241.462
(33) Polyhymnia	1922 Nov. 17	Asteroid	160.123	91.999
		Berlin A 630	102.650	119.003
		Leipzig I 667 Berlin A 631	110.897	82.656
		Leipzig I 675	179.822	49.803
		Berlin A 644	204.099	123.575
	21	Asteroid	227.171	161.249
		Berlin A 619	168.540	195.813
		Leipzig I 663	219.431	74.901
		Berlin A 630	227.006	206.099
		Leipzig I 667 Berlin A 631	235.075	169.498
(34) Circe	1916 Jan. 7	Asteroid	166.558	209.606
		Leipzig I 3030	143.442	193.426
		Leipzig I 3034	162.028	258.202
		Leipzig I 3052	196.151	156.180
	8	Asteroid	209.707	263.198
		Leipzig I 3028	200.300	289.603
		Leipzig I 3030	207.950	242.794
		Leipzig I 3034	226.512	307.605
(37) Fides	1917 Feb. 17	Asteroid	129.320	166.000
		Berlin A 3966	103.074	221.649
		Berlin A 3975	123.796	132.750
		Berlin A 3977	130.868	148.541
	20	Asteroid	228.730	172.595
		Berlin A 3950	206.896	213.999
		Berlin A 3958	235.160	163.460
		Berlin A 3961	242.148	160.113
(38) Leda	1922 Sept. 16	Asteroid	207.651	199.153
		Albany 7918	276.600	269.245
		Albany 7925	234.215	145.754
		Albany 7927	214.776	124.491
		Albany 7936	173.529	225.402
		Albany 7938	161.653	166.724
	19	Asteroid	222.323	223.270
		Albany 7897	98.771	264.305
		Albany 7913	161.180	164.222
		Albany 7918	212.343	173.898
		Albany 7925	256.144	296.940
(39) Laetitia	1916 Mar. 31	Asteroid	253.849	170.132
		Leipzig II 5818	210.984	181.745
		Leipzig II 5830	286.698	113.810
		Leipzig II 5831	293.187	175.806
	Apr. 10	Asteroid	162.992	229.739
		Leipzig II 5786	104.795	201.996
		Leipzig II 5804	188.830	216.417
		Leipzig I 4291	206.312	232.103
(41) Daphne	1916 Apr. 10	Asteroid	282.206	152.603
		Albany 4576 Albany 4577	272.822	141.514
		Albany 4580	302.404	111.302
		Albany 4581	305.750	119.252
	1921 July 2	Asteroid	121.551	178.752
		Albany 6293	86.857	139.299
		Albany 6301	109.543	152.175
		Albany 6302	113.042	208.602
		Albany 6309	121.929	197.876
	25	Asteroid	177.123	82.791
		Albany 6208	161.310	112.561
		Albany 6213	181.161	136.301
		Albany 6214	185.814	42.687
		Albany 6226	222.755	50.808
(49) Pales	1917 Oct. 13	Asteroid	124.700	192.848
		Leipzig I 178	103.983	224.050
		Leipzig II 236	137.651	152.354
		Leipzig II 240	156.650	139.976
(50) Virginia	1922 Dec. 19	Asteroid	195.623	264.349
		Berlin A 1370	139.285	201.141
		Berlin A 1381	214.168	201.126
		Berlin A 1384	233.251	264.651
		Berlin A 1385	235.185	204.003
	22	Asteroid	209.458	239.949
		Berlin A 1358	140.694	204.372
		Berlin A 1362	167.303	262.147
		Berlin A 1370	215.715	177.479
		Berlin A 1384	309.746	242.163
(51) Nemausa	1916 Mar. 4	Asteroid	97.101	188.109
		Leipzig II 4880	74.663	167.802
		Leipzig II 4890	109.698	254.513
		Leipzig II 4896	114.589	172.053
(52) Europa	1923 Jan. 9	Asteroid	99.712	197.300
		Berlin A 3109	117.802	159.505
		Berlin A 3121	100.246	206.801
		Berlin A 3126	90.198	184.854
		Berlin A 3130	77.545	217.096
	13	Asteroid	224.743	212.523
		Berlin A 3072	198.453	193.900
		Berlin A 3081	206.757	202.650
		Berlin A 3092	237.575	233.670
		Berlin A 3095	240.098	219.820
(57) Mnemosyne	1915 Oct. 9	Asteroid	178.537	118.595
		Leipzig II 171	152.744	145.291
		Leipzig II 180	185.642	148.719
		Leipzig II 185	207.928	93.794

[1] Zone Cat. A (1900).

[The Astronomische Gesellschaft Catalogue positions used for the comparison stars unless otherwise indicated]

Name	Date	Catalogue	Measures x	Measures y
(57) Mnemosyne (Con.)	1915 Oct 10	Asteroid	230. 797	151. 550
		Leipzig II 157	183. 965	119. 732
		Leipzig II 166	205. 057	183. 649
		Leipzig II 171	219. 871	193. 608
	11	Asteroid	303. 892	186. 800
		Leipzig II 157	271. 069	169. 623
		Leipzig II 162	281. 993	234. 388
		Leipzig II 166	292. 141	233. 603
(58) Concordia	1917 Jan. 16	Asteroid	204. 349	175. 347
		Berlin A 2431	197. 177	143. 589
		Berlin A 2432	199. 001	151. 048
		Berlin A 2448	222. 490	187. 552
	19	Asteroid	223. 062	158. 551
		Berlin A 2382	188. 752	120. 350
		Berlin A 2388	195. 741	191. 000
		Berlin A 2405	236. 159	204. 288
	1922 Mar. 17	Asteroid	213. 459	102. 458
		Leipzig II 5683	197. 921	120. 373
		Leipzig II 5684	198. 190	148. 434
		Leipzig II 5689	215. 626	87. 825
		Leipzig II 5697	248. 271	75. 583
	22	Asteroid	176. 528	91. 580
		Leipzig II 5663	143. 632	40. 253
		Leipzig II 5667	164. 244	163. 288
		Leipzig II 5670	189. 126	54. 457
		Leipzig II 5671	189. 890	109. 237
(59) Elpis	1916 Mar. 31	Asteroid	135. 853	165. 803
		Leipzig II 5495	96. 902	128. 761
		Leipzig II 5496	103. 471	114. 406
		Leipzig II 5508	172. 345	172. 918
(60) Echo	1916 Nov. 27	Asteroid	263. 119	238. 079
		Leipzig I 1154	239. 623	241. 700
		Leipzig II 1158	253. 590	179. 579
		Leipzig II 1171	290. 101	279. 450
	Dec. 1	Asteroid	227. 396	211. 139
		Leipzig I 1132	182. 260	251. 499
		Leipzig I 1135	187. 997	247. 428
		Leipzig I 1149	273. 363	221. 083
(61) Danaë	1922 Sept. 22	Asteroid	145. 802	126. 050
		Leipzig II 11557	128. 873	124. 589
		Leipzig II 11560	134. 668	153. 208
		Leipzig II 11577	205. 851	82. 001
		Leipzig II 11578	209. 557	142. 457
	23	Asteroid	166. 082	175. 420
		Leipzig II 11544 Albany 7993	117. 471	97. 718
		Leipzig II 11553	164. 324	212. 605
		Leipzig II 11554	164. 326	220. 687
		Leipzig II 11557	172. 849	171. 816
(62) Erato	1921 Nov. 22	Asteroid	112. 843	216. 252
		Leipzig I 919	112. 575	255. 324
		Leipzig I 920	121. 359	254. 591
		Leipzig I 921	122. 329	200. 207
		Leipzig I 922	125. 022	187. 476
	25	Asteroid	258. 887	185. 524
		Leipzig I 903	227. 723	135. 842
		Leipzig I 904	240. 225	156. 450
		Leipzig I 909	267. 377	254. 618
		Leipzig I 912	296. 488	189. 037
	1923 Mar. 9	Asteroid	100. 450	252. 867
		Berlin A 3939	58. 405	265. 886
		Berlin A 3946	68. 800	269. 366
		Leipzig I 3881	89. 077	225. 947
		Berlin A 3959 Leipzig I 3887	121. 449	260. 315
		Berlin A 3967	153. 054	282. 248
(62) Erato (Contd.)	1923 Mar. 10	Asteroid	216. 076	258. 500
		Berlin A 3939	188. 626	265. 307
		Berlin A 3942	197. 967	301. 249
		Berlin A 3946	198. 971	268. 831
		Leipzig I 3881	219. 399	225. 537
		Berlin A 3959 Leipzig I 3887	251. 573	260. 048
(64) Angelina	1918 Mar. 11	Asteroid	53. 892	224. 747
		Leipzig II 5653	29. 831	169. 503
		Leipzig II 5662	82. 495	240. 896
		Leipzig II 5668	105. 696	214. 650
(65) Cybele	1915 Nov. 10	Asteroid	150. 986	150. 544
		Leipzig I 1054	128. 902	111. 068
		Leipzig I 1055	132. 259	180. 951
		Leipzig I 1057	153. 698	188. 386
	26	Asteroid	286. 668	175. 198
		Leipzig I 997	225. 016	153. 574
		Leipzig I 1005	267. 774	132. 254
		Leipzig I 1009	286. 535	198. 758
	1918 Mar. 15	Asteroid	160. 102	277. 363
		Leipzig II 5770	117. 998	268. 561
		Leipzig II 5775	133. 712	219. 377
		Leipzig II 5779	156. 398	329. 379
	17	Asteroid	181. 350	289. 248
		Leipzig II 5764	166. 549	318. 796
		Leipzig II 5770	172. 438	263. 385
		Leipzig II 5774	181. 899	315. 200
(67) Asia	1915 Dec. 10	Asteroid	160. 097	190. 506
		Berlin A 1811	118. 903	173. 121
		Berlin A 1835	149. 809	184. 722
		Berlin A 1857	191. 760	192. 021
	1916 Jan. 2	Asteroid	127. 202	199. 394
		Leipzig I 1710	110. 749	175. 034
		Leipzig I 1723	146. 719	224. 115
		Leipzig I 1727	168. 900	193. 659
	1920 Jan. 14	Asteroid	118. 773	129. 199
		Leipzig I 2706	78. 254	136. 136
		Leipzig I 2708	78. 175	117. 251
		Leipzig I 2740	139. 130	159. 445
		Leipzig I 2741	145. 168	93. 177
	18	Asteroid	210. 685	110. 867
		Leipzig I 2672	194. 158	161. 065
		Leipzig I 2680	210. 709	86. 372
		Leipzig I 2686	226. 699	122. 420
		Leipzig I 2691	228. 976	93. 901
	1922 Oct. 20	Asteroid	138. 673	262. 121
		Leipzig II 564	120. 348	196. 994
		Leipzig II 567	140. 480	268. 102
		Leipzig II 568	142. 846	267. 193
		Leipzig II 576	182. 211	212. 408
	24	Asteroid	158. 348	308. 834
		Leipzig II 535	123. 911	271. 801
		Leipzig II 539	136. 315	325. 618
		Leipzig II 543	157. 493	290. 402
		Leipzig II 552	178. 323	286. 451
(69) Hesperia	1915 Sept. 10	Asteroid	163. 620	95. 860
		Nicolajew 5785	109. 560	59. 392
		Nicolajew 5788	168. 759	50. 265
		Nicolajew 5794	216. 871	129. 407
	13	Asteroid	200. 316	130. 408
		Nicolajew 5785	198. 657	124. 844
		Nicolajew 5788	257. 932	115. 928
		Nicolajew 5789	270. 262	128. 461

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Name	Date	Catalogue	Measures x	Measures y
(70) Panopaea	1917 Oct. 17	Asteroid	251.247	242.040
		Leipzig II 886	208.410	263.355
		Leipzig II 899	261.745	264.251
		Leipzig II 903	274.196	212.895
	21	Asteroid	192.898	251.796
		Leipzig II 867	180.850	210.938
		Leipzig II 874	206.896	262.404
		Leipzig II 878	209.488	240.321
	1920 Apr. 21	Asteroid	180.322	259.425
		Nicolajew 3560	111.433	171.927
		Nicolajew 3562 Albany 4687	147.451	285.851
		Nicolajew 3566	224.438	228.958
		Nicolajew 3568	232.099	179.390
	24	Asteroid	164.636	67.544
		Nicolajew 3553	86.164	59.339
		Nicolajew 3557	114.457	37.502
		Albany 4682	191.412	141.706
		Nicolajew 3562 Albany 4687	201.546	89.240
(72) Feronia	1920 Oct. 5	Asteroid	156.671	53.134
		Leipzig II 95	122.663	36.421
		Leipzig II 103	155.501	101.161
		Leipzig II 124	223.445	54.272
	11	Asteroid	228.546	196.492
		Leipzig II 69	203.925	281.543
		Albany 46	212.851	179.027
		Albany 49	240.912	149.399
		Albany 52	252.200	257.073
(78) Diana	1916 Sept. 23	Asteroid	236.763	218.743
		Leipzig II 11814	183.362	178.225
		Leipzig II 11829	247.069	237.183
		Leipzig II 11837	279.176	224.725
	25	Asteroid	195.300	292.942
		Leipzig II 11809	176.100	321.903
		Leipzig II 11810	183.535	280.445
		Leipzig II 11814	186.976	263.112
	1918 Mar. 11	Asteroid	235.745	306.569
		Leipzig I 3922	204.497	260.790
		Leipzig I 3926	218.392	249.934
		Leipzig I 3931	242.100	313.651
(81) Terpsichore	1922 Oct. 19	Asteroid	151.318	132.001
		Berlin A 418	122.438	194.450
		Leipzig I 417	129.164	47.987
		Leipzig I 429	187.027	100.724
		Leipzig I 430	187.898	157.050
		Leipzig I 431	187.729	78.400
	24	Asteroid	157.100	182.844
		Leipzig I 383	95.428	175.321
		Berlin A 386 Leipzig I 385	96.567	234.748
		Leipzig I 396	143.150	188.104
		Berlin A 408 Leipzig I 405	186.098	237.874
(84) Klio	1918 Feb. 11	Asteroid	179.853	229.049
		Leipzig I 3881	106.070	271.039
		Leipzig I 3884	111.176	168.364
		Leipzig I 3898	243.049	244.565
	12	Asteroid	113.695	206.399
		Leipzig I 3881	65.859	243.001
		Leipzig I 3885	83.064	101.146
		Berlin A 3959	97.261	278.248
(85) Io	1917 Nov. 8	Asteroid	102.349	285.595
		Leipzig II 795	68.034	318.823
		Leipzig II 796	73.298	266.924
		Leipzig II 801	88.074	226.423
(85) Io (Contd.)	1917 Nov. 9	Asteroid	186.826	195.239
		Leipzig II 795	204.348	148.774
		Leipzig II 796	197.863	200.498
		Leipzig II 798	190.998	135.749
(86) Semele	1917 Mar. 28	Asteroid	172.223	197.248
		Leipzig II 6020	158.749	149.099
		Leipzig II 6022	177.498	242.100
		Leipzig II 6026	212.153	234.509
	30	Asteroid	154.317	140.367
		Leipzig II 6020	174.751	78.958
		Leipzig II 6022	193.806	171.858
		Leipzig II 6026	228.437	164.207
(88) Thisbe	1917 Sept. 13	Asteroid	140.494	208.700
		Albany 8035	191.048	257.502
		Albany 8039	183.724	258.501
		Albany 8044	145.956	166.044
	17	Asteroid	241.524	282.495
		Albany 8025	219.414	214.706
		Albany 8035	268.064	264.590
		Albany 8039	275.422	263.549
(90) Antiope	1912 Dec. 13	Asteroid	179.685	245.564
		Berlin B 2541	159.251	230.730
		Berlin B 2553	184.391	270.700
		Berlin B 2556	188.039	249.923
	15	Asteroid	198.142	241.445
		Berlin B 2525	173.264	217.061
		Berlin B 2553	237.967	262.270
		Berlin B 2556	241.745	241.534
	30	Asteroid	31.227	198.341
		Berlin B 2404	54.388	193.231
		Berlin B 2413	34.408	157.249
		Berlin B 2416	23.532	211.765
(91) Aegina	1918 Mar. 15	Asteroid	252.801	259.950
		Leipzig II 5788	198.496	240.832
		Leipzig II 5795	242.925	295.700
		Leipzig II 5798	250.179	328.693
	17	Asteroid	268.743	245.045
		Leipzig II 5782	223.711	231.652
		Leipzig II 5788	257.828	210.486
		Leipzig II 5791	264.097	292.103
	1920 Oct. 13	Asteroid	95.678	127.746
		Albany 48	32.020	126.498
		Albany 55	63.641	196.870
		Albany 63	120.473	80.725
		Albany 64	121.850	93.332
		Albany 67	148.015	169.123
	14	Asteroid	100.657	134.028
		Albany 48	56.961	140.250
		Nicolajew 43	83.555	69.777
		Albany 55	89.374	210.283
		Albany 65	149.683	92.773
(92) Undina	1917 May 12	Asteroid	97.052	267.123
		Albany 4800	66.297	269.402
		Albany 4811	138.702	213.171
		Albany 4813	141.798	287.003
	14	Asteroid	140.901	256.101
		Albany 4800	138.941	257.183
		Albany 4801	141.252	273.907
		Albany 4811	210.812	200.328
	1919 Nov. 15	Asteroid	150.268	277.196
		Straszburg 337	116.122	280.297
		Straszburg 344	153.446	263.650
		Straszburg 347	172.522	263.679
	17	Asteroid	155.555	192.314
		Straszburg 337	144.550	191.552
		Straszburg 344	182.052	175.408
		Straszburg 347	201.103	175.718

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Name	Date	Catalogue	Measures x	Measures y
(93) Minerva	1922 Oct. 18	Asteroid	128.048	233.345
		Albany 53	70.577	197.779
		Albany 54	76.926	263.349
		Albany 57	88.880	279.863
		Albany 69	171.516	173.733
	20	Asteroid	228.034	179.942
		Albany 51	197.624	120.348
		Albany 53	207.675	150.425
		Albany 54	213.251	216.045
		Albany 56	222.075	225.931
(94) Aurora	1923 Sept. 16	Asteroid	200.251	233.097
		Wien-Ottak. 8304	175.452	175.668
		Wien-Ottak. 8307	183.975	232.628
		Wien-Ottak. 8316	223.351	215.701
		Wien-Ottak. 8317	234.852	266.980
	17	Asteroid	129.195	157.350
		Wien-Ottak. 8298	84.049	160.201
		Wien-Ottak. 8299	84.122	176.753
		Wien-Ottak. 8301	98.401	196.523
		Wien-Ottak. 8304	124.074	104.001
		Wien-Ottak. 8307	132.754	160.953
(96) Aegle	1916 Mar. 4	Asteroid	244.250	129.827
		Leipzig I 3698	293.268	100.441
		Leipzig I 3700	253.695	146.250
		Leipzig I 3703	230.250	146.902
(97) Klotho	1916 Mar. 31	Asteroid	43.188	197.820
		Leipzig II 5895	57.196	158.617
		Leipzig II 5900	77.103	231.847
		Leipzig II 5905	93.015	173.751
(100) Hekate	1918 Nov. 27	Asteroid	82.086	100.403
		Leipzig I 1083	55.013	105.809
		Leipzig I 1088	74.872	61.156
		Leipzig I 1094	107.827	110.864
	Dec. 5	Asteroid	162.128	175.157
		Leipzig II 1337	152.252	51.442
		Leipzig II 1347	177.058	54.512
		Leipzig I 1068	179.424	252.945
(101) Helena	1922 Sept. 22	Asteroid	135.080	176.326
		Albany 8126	115.614	124.822
		Albany 8128	116.375	155.204
		Albany 8133	156.376	214.672
		Albany 8137	185.380	175.688
	25	Asteroid	134.628	190.196
		Albany 8114	113.899	168.479
		Albany 8116	123.597	154.676
		Albany 8118	126.726	190.561
		Albany 8119	127.650	213.699
		Albany 8128	188.243	172.305
(103) Hera	1922 Dec. 19	Asteroid	224.353	112.746
		Berlin A 1373	154.786	102.150
		Berlin A 1379	171.851	145.008
		Berlin A 1386	239.729	122.309
		Berlin A 1388	245.325	51.333
	22	Asteroid	225.016	104.903
		Berlin A 1367	181.155	106.945
		Berlin A 1373	219.070	90.050
		Berlin A 1379	235.309	133.545
		Berlin A 1386	304.141	112.199
(110) Lydia	1917 Oct. 13	Asteroid	229.893	89.893
		Albany 487	203.620	119.705
		Albany 493	224.500	98.744
		Albany 504	289.397	54.870
(110) Lydia (Contd.)	1917 Oct. 15	Asteroid	242.926	141.857
		Albany 480	229.945	128.736
		Albany 483	236.400	105.322
		Albany 487	258.031	180.974
(115) Thyra	1917 Feb. 17	Asteroid	278.304	304.750
		Leipzig II 5186	283.521	339.255
		Leipzig II 5189	293.752	275.095
		Leipzig II 5194	314.064	227.496
	20	Asteroid	289.604	295.589
		Leipzig II 5150	248.157	317.051
		Leipzig II 5161	288.251	256.665
		Leipzig II 5163	291.821	266.044
(116) Sirona	1922 Oct. 20	Asteroid	190.121	52.107
		Leipzig II 595	154.846	68.143
		Leipzig II 608	191.283	101.000
		Leipzig II 623	236.206	36.545
		Leipzig II 626	243.545	104.450
	24	Asteroid	188.695	118.204
		Leipzig II 570	147.026	109.199
		Leipzig II 573	160.454	145.749
		Leipzig II 582	189.903	147.330
		Leipzig II 592	226.840	115.457
(119) Althaea	1915 Oct. 28	Asteroid	136.098	176.644
		Leipzig II 420	103.390	188.176
		Leipzig II 423	110.075	182.701
		Leipzig II 436	165.520	161.777
	29	Asteroid	210.729	145.320
		Leipzig II 420	193.798	167.898
		Leipzig II 423	200.492	162.447
		Leipzig II 436	255.950	141.478
	1917 Feb. 17	Asteroid	105.194	135.401
		Leipzig II 5131	87.846	121.542
		Leipzig II 5139	102.254	88.878
		Leipzig II 5143	117.825	189.350
	20	Asteroid	133.527	152.002
		Leipzig II 5118	135.542	110.252
		Leipzig II 5122	147.169	172.604
		Leipzig II 5125	164.447	190.745
(121) Hermione	1916 Mar. 31	Asteroid	297.995	118.623
		Albany 4682	257.848	119.452
		Albany 4694	287.755	139.896
		Albany 4695	298.071	173.082
	Apr. 10	Asteroid	248.542	179.791
		Albany 4659	181.660	205.578
		Albany 4666	236.759	228.203
		Albany 4670	270.179	138.998
	29	Asteroid	310.082	230.002
		Albany 4612	258.045	190.794
		Albany 4617	280.246	226.208
		Albany 4620	296.947	272.608
(122) Gerda	1916 Mar. 8	Asteroid	222.752	267.247
		Leipzig I 3899	199.077	207.283
		Leipzig I 3912	254.898	271.397
		Leipzig I 3915	271.156	287.906
	23	Asteroid	168.923	223.318
		Leipzig I 3876	146.304	212.010
		Leipzig I 3877	160.455	212.003
		Leipzig I 3885	207.780	265.589
	1917 May 11	Asteroid	176.447	112.997
		Washington 5745	148.867	146.202
		Washington 5749	169.446	114.998
		Washington 5752	185.909	104.652
	14	Asteroid	140.344	108.476
		Washington 5726	76.747	109.671
		Washington 5731	86.349	99.605
		Washington 5741	136.966	134.999

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Name	Date	Catalogue	Measures	
			x	y
(122) Gerda (Contd.)	1917 May 23	Asteroid	98.298	155.552
		Washington 5700	75.403	145.097
		Washington 5703	97.452	169.634
		Washington 5709	121.457	155.643
	25	Asteroid	222.196	225.772
		Washington 5693	202.930	227.849
		Washington 5700	233.998	205.933
		Washington 5703	256.264	230.189
(123) Brunhild	1921 Sept. 23	Asteroid	150.856	169.874
		Leipzig II 11797	134.288	199.148
		Leipzig II 11800	148.890	204.112
		Leipzig II 11812	188.756	182.081
		Leipzig II 11813	189.019	166.872
	28	Asteroid	143.424	243.354
		Leipzig II 11771	117.053	236.600
		Leipzig II 11778	127.365	254.391
		Leipzig II 11783	171.243	143.897
		Leipzig II 11793	202.374	189.555
	1923 Feb. 20	Asteroid	190.827	186.326
		Leipzig I 3659	168.600	179.854
		Berlin A 3686	174.700	241.250
		Leipzig I 3662	181.150	180.575
		Berlin A 3687	183.199	245.251
		Leipzig I 3669 Berlin A 3704	224.228	219.797
	21	Asteroid	173.560	179.647
		Berlin A 3674 Leipzig I 3652	140.242	216.344
		Leipzig I 3659	170.573	170.574
		Berlin A 3686	176.674	231.976
		Leipzig I 3662	183.125	171.289
		Berlin A 3687	185.186	235.993
(124) Alkeste	1915 Sept. 15	Asteroid	48.054	212.726
		Leipzig II 328	53.764	170.090
		Leipzig II 330	57.501	171.569
		Leipzig II 333	70.225	265.494
	16	Asteroid	104.581	289.601
		Leipzig II 304	27.936	271.056
		Leipzig II 328	127.688	255.489
		Leipzig II 341	185.273	295.794
(125) Liberatrix	1918 Nov. 25	Asteroid	119.580	117.155
		Leipzig I 975	73.398	103.488
		Leipzig I 985	148.476	183.751
		Leipzig I 988	158.499	140.538
	26	Asteroid	178.854	183.517
		Leipzig I 975	151.732	174.914
		Leipzig I 985	226.781	255.059
		Leipzig I 988	236.797	211.851
(126) Velleda	1914 Nov. 17	Asteroid	60.365	276.345
		Berlin A 832	48.997	293.518
		Berlin A 836	51.461	248.185
	1916 Mar. 23	Asteroid	134.185	124.702
		Leipzig I 4156	133.901	157.854
		Leipzig I 4157	134.257	155.104
		Leipzig I 4164	161.822	106.849
(127) Johanna	1920 Mar. 24	Asteroid	166.210	143.405
		Leipzig II 5988	129.698	185.268
		Leipzig II 5993	144.202	182.276
		Leipzig II 5994	143.091	87.550
		Leipzig II 6000	185.602	172.848
	27	Asteroid	201.148	181.668
		Leipzig II 5970	162.328	173.352
		Leipzig II 5971	164.383	139.248
		Leipzig II [illegible]	217.800	[illegible]
		Leipzig II 5988	230.050	211.298
(128) Nemesis	1915 Mar. 13	Asteroid	132.766	304.541
		Berlin A 4292	100.491	331.905
		Berlin A 4297	123.001	305.669
		Berlin A 4298	120.963	261.809
	17	Asteroid	107.140	280.900
		Berlin A 4275	75.016	239.645
		Berlin A 4284	114.938	280.764
		Berlin A 4287	122.725	242.116
	1920 Apr. 14	Asteroid	218.050	123.998
		Albany 4610	200.296	109.296
		Albany 4612	225.553	88.905
		Albany 4614	243.637	190.494
		Albany 4617	247.249	124.575
	21	Asteroid	120.103	212.429
		Albany 4586	73.356	245.698
		Albany 4597	122.883	206.197
		Albany 4599	132.673	231.905
		Albany 4600	134.143	203.051
(129) Antigone	1917 Mar. 12	Asteroid	288.160	142.447
		Berlin A 4283	277.015	134.533
		Berlin A 4285	288.419	148.838
		Berlin A 4288	294.651	100.556
	15	Asteroid	236.115	323.885
		Berlin A 4266	212.476	248.095
		Berlin A 4275	247.451	322.441
		Berlin A 4283	277.923	277.193
(130) Elektra	1917 Feb. 24	Asteroid	93.241	204.395
		Leipzig I 3963	77.782	141.422
		Leipzig I 3964	80.493	207.459
		Leipzig I 3970	128.688	186.930
	Mar. 12	Asteroid	89.868	175.564
		Berlin A 4000	45.124	174.666
		Berlin A 4012	94.672	153.172
		Berlin A 4019	105.371	163.285
(131) Vala	1916 Nov. 18	Asteroid	53.649	158.200
		Leipzig I 883	46.062	105.151
		Leipzig I 884	65.608	210.304
		Leipzig I 887	80.044	214.353
(132) Aethra	1922 Dec. 22	Asteroid	80.430	168.818
		Leipzig I 1788	117.801	179.199
		Berlin A 1695	82.958	104.849
		Leipzig I 1797	81.472	199.234
		Leipzig I 1801	70.696	146.798
	23	Asteroid	249.981	178.449
		Leipzig I 1779	224.274	191.555
		Liepzig I 1786	233.500	106.220
		Leipzig I 1788	242.668	201.564
		Leipzig I 1797	279.112	181.742
	24	Asteroid	175.278	219.798
		Leipzig I 1764	136.885	229.641
		Leipzig I 1776	178.875	267.621
		Leipzig I 1781	185.022	170.733
		Leipzig I 1786	190.640	183.443
	26	Asteroid	185.072	204.950
		Leipzig I 1750	172.102	183.494
		Leipzig I 1752	177.362	258.198
		Leipzig I 1759	189.000	226.217
		Leipzig I 1760	192.964	166.751
	29	Asteroid	196.950	159.115
		Leipzig I 1713	159.402	141.248
		Leipzig I 1715	163.524	115.528
		Leipzig I 1716	170.604	177.251
		Leipzig I 1718	175.900	206.360
		Leipzig I [illegible]	[illegible]	[illegible]
		Leipzig I 1733	226.198	114.400

[The Astronomische Gesellschaft Catalogue positions used for the comparison stars unless otherwise indicated]

Name	Date	Catalogue	Measures x	Measures y
(132) Aethra (Contd.)	1922 Dec. 29	Asteroid	200.648	157.676
		Leipzig I 1713	164.086	140.497
		Leipzig I 1715	168.377	114.793
		Leipzig I 1716	175.046	176.561
		Leipzig I 1718	180.150	205.726
		Leipzig I 1720	182.702	109.519
		Leipzig I 1733	231.051	114.089
	1923 Jan. 5	Asteroid	106.848	166.882
		Leipzig II 2196	59.804	153.712
		Leipzig II 2198	78.967	107.647
		Leipzig I 1656	87.882	192.593
		Leipzig I 1657	95.375	192.501
		Leipzig I 1662	125.449	196.045
		Leipzig I 1667	133.719	194.600
	8	Asteroid	147.476	240.153
		Leipzig II 2165	96.359	264.963
		Leipzig II 2174	123.846	270.251
		Leipzig II 2177	130.245	292.540
		Leipzig II 2179	136.655	298.842
		Leipzig II 2182	142.696	175.748
		Leipzig II 2185	148.379	184.898
		Leipzig II 2191	156.477	193.732
		Leipzig II 2195	170.149	206.904
	9	Asteroid	156.581	196.078
		Leipzig II 2164	124.975	124.505
		Leipzig II 2165	129.456	251.352
		Leipzig II 2167	132.030	186.675
		Leipzig II 2176	157.443	120.399
		Leipzig II 2180	172.902	234.554
		Leipzig II 2182	176.316	162.452
		Leipzig II 2185	181.933	171.643
		Leipzig II 2191	189.974	180.522
	13	Asteroid	160.296	196.566
		Leipzig II 2132	125.225	195.245
		Leipzig II 2137	140.201	153.044
		Leipzig II 2138	145.520	220.617
		Leipzig II 2148	159.253	254.201
		Leipzig II 2152	162.892	176.199
		Leipzig II 2155	168.112	173.950
		Leipzig II 2157	184.909	162.373
		Leipzig II 2158	186.038	223.224
	13	Asteroid	159.675	205.523
		Leipzig II 2132	125.925	205.920
		Leipzig II 2137	140.964	163.737
		Leipzig II 2138	146.180	231.347
		Leipzig II 2148	159.882	264.954
		Leipzig II 2152	163.601	186.949
		Leipzig II 2155	168.824	184.700
		Leipzig II 2157	185.653	173.147
		Leipzig II 2158	186.681	234.005
	19	Asteroid	150.628	211.778
		Leipzig II 2094	125.227	228.673
		Leipzig II 2099	133.656	245.669
		Leipzig II 2101	138.276	183.105
		Leipzig II 2108	155.305	167.144
		Leipzig II 2116	167.791	242.583
		Leipzig II 2122	190.254	198.701
	22	Asteroid	205.537	188.694
		Albany 1625	169.833	175.025
		Leipzig II 2092	198.709	213.437
		Albany 1640	213.240	151.387
		Leipzig II 2101	228.967	230.509
		Albany 1643	231.203	153.222
		Leipzig II 2108	245.918	214.514
		Albany 1648	253.211	185.542
	24	Asteroid	212.538	191.330
		Albany 1611	157.299	214.723
		Albany 1613	159.281	153.697
		Albany 1625	194.752	220.798
		Albany 1628	195.182	152.369
		Albany 1640	238.340	197.400
		Albany 1643	256.302	199.375
	Feb. 8	Asteroid	165.240	171.454
		Albany 1618	113.129	213.206
		Albany 1624	133.636	231.652
		Albany 1627	143.397	234.002
		Albany 1630	145.099	235.994
		Albany 1637	171.523	153.496
		Albany 1639	183.462	171.844
		Albany 1642	190.724	161.794
(132) Aethra (Contd.)	1923 Feb. 14	Asteroid	153.461	163.898
		Nicolajew 1263	145.069	106.189
		Albany 1651 } Nicolajew 1264 }	147.814	170.401
		Albany 1654	166.318	215.434
		Albany 1658 } Nicolajew 1267 }	170.674	157.428
		Albany 1660	179.572	202.572
	16	Asteroid	150.262	164.825
		Nicolajew 1264 } Albany 1651 }	114.599	191.900
		Nicolajew 1267 } Albany 1658 }	137.459	178.949
		Nicolajew 1268	143.106	151.325
		Nicolajew 1275	161.702	165.026
		Nicolajew 1276	167.254	127.951
		Albany 1665 } Nicolajew 1277 }	172.605	168.801
	19	Asteroid	170.794	180.151
		Nicolajew 1276	136.128	171.201
		Albany 1665 } Nicolajew 1277 }	141.301	212.104
		Nicolajew 1284	187.171	134.276
		Nicolajew 1285	193.696	156.504
		Nicolajew 1288	196.603	224.353
		Nicolajew 1290	204.423	178.245
	21	Asteroid	118.235	140.417
		Nicolajew 1285	101.468	134.102
		Nicolajew 1290	112.394	155.713
		Nicolajew 1295	121.505	175.028
		Nicolajew 1300	145.173	165.602
		Nicolajew 1304	168.022	141.740
	Mar. 8	Asteroid	200.367	113.075
		Nicolajew 1430	159.128	147.795
		Nicolajew 1441	197.799	93.883
		Nicolajew 1448	221.295	194.852
		Nicolajew 1449	226.279	62.907
		Nicolajew 1452	256.556	160.752
	9	Asteroid	186.322	185.076
		Nicolajew 1441	150.702	171.098
		Nicolajew 1448	174.375	271.948
		Nicolajew 1449	179.102	140.049
		Nicolajew 1452	209.618	237.745
		Nicolajew 1459	238.080	148.376
	14	Asteroid	144.689	128.496
		Nicolajew 1471	130.645	133.725
		Nicolajew 1473	133.367	141.371
		Nicolajew 1474	136.807	132.651
		Nicolajew 1478	148.822	141.472
		Nicolajew 1481	163.895	140.004
	17	Asteroid	149.552	199.090
		Nicolajew 1490	118.554	189.861
		Nicolajew 1492	125.673	200.676
		Nicolajew 1497	174.140	185.523
		Nicolajew 1501	189.950	240.753
		Nicolajew 1504	202.125	187.031
		Nicolajew 1505	209.477	204.454
	20	Asteroid	154.335	231.999
		Nicolajew 1504	89.518	232.097
		Nicolajew 1508	121.621	222.153
		Nicolajew 1514	153.948	238.670
		Nicolajew 1518	171.189	206.585
		Nicolajew 1519	172.086	227.301
		Nicolajew 1520	188.561	195.032
	21	Asteroid	144.877	203.498
		Nicolajew 1514	104.026	214.331
		Nicolajew 1519	122.155	202.916
		Nicolajew 1520	138.662	170.623
		Nicolajew 1522	151.028	261.824
		Nicolajew 1523	157.873	244.153
	24	Asteroid	236.226	190.130
		Nicolajew 1531	181.848	218.049
		Nicolajew 1536	224.148	157.001
		Nicolajew 1537	228.350	156.022
		Nicolajew 1538	234.002	199.330
		Nicolajew 1542	248.732	187.707
		Nicolajew 1549	272.057	210.294

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Name	Date	Catalogue	Measures x	Measures y
(133) Cyrene	1916 Sept. 20	Asteroid	143. 152	113. 897
		Albany 8070	83. 830	104. 355
		Albany 8072	101. 898	165. 271
		Albany 8076	135. 191	91. 096
	21	Asteroid	172. 534	195. 752
		Albany 8070	131. 598	191. 901
		Albany 8072	149. 768	252. 749
		Albany 8076	182. 902	178. 574
(135) Hertha	1923 Mar. 9	Asteroid	123. 572	177. 940
		Leipzig I 3879	71. 800	174. 626
		Leipzig I 3881	89. 075	225. 950
		Leipzig I 3884	91. 026	123. 850
		Berlin A 3959 Leipzig I 3887	121. 452	260. 328
		Leipzig I 3898	224. 298	195. 383
	10	Asteroid	234. 936	183. 694
		Leipzig I 3873	173. 051	191. 700
		Leipzig I 3879	202. 351	174. 156
		Leipzig I 3881	219. 398	225. 520
		Leipzig I 3884	221. 748	123. 463
		Berlin A 3959 Leipzig I 3887	251. 581	260. 049
(136) Austria	1920 Sept. 15	Asteroid	252. 016	243. 228
		Albany 8207	193. 270	229. 979
		Albany 8213	225. 723	277. 435
		Albany 8223	271. 835	189. 602
		Albany 8225	280. 100	253. 406
	17	Asteroid	165. 072	258. 050
		Albany 8206	143. 874	276. 801
		Albany 8209	152. 716	275. 146
		Albany 8211	174. 198	204. 976
		Albany 8214	175. 556	205. 797
		Albany 8223	224. 272	241. 594
(138) Tolosa	1917 Nov. 7	Asteroid	306. 469	130. 039
		Leipzig I 768	279. 283	176. 241
		Leipzig I 770	282. 324	141. 851
		Leipzig I 775	300. 448	109. 742
	8	Asteroid	251. 372	237. 927
		Leipzig I 765	221. 436	220. 791
		Leipzig I 768	248. 759	289. 465
		Leipzig I 775	269. 121	222. 722
	1923 Mar. 14	Asteroid	261. 498	185. 494
		Berlin A 4094	215. 783	164. 253
		Berlin A 4096	230. 402	225. 643
		Berlin A 4098	245. 045	175. 966
		Berlin A 4102	266. 201	106. 572
		Berlin A 4113	301. 352	197. 601
	17	Asteroid	296. 825	171. 943
		Berlin A 4073	223. 728	182. 052
		Berlin A 4081	241. 892	113. 851
		Berlin A 4084	272. 282	207. 113
		Berlin A 4086	274. 950	217. 052
		Berlin A 4094	305. 386	134. 601
(140) Siwa	1915 Nov. 27	Asteroid	176. 837	288. 114
		Berlin A 1103	148. 408	228. 931
		Berlin A 1106	162. 000	235. 909
		Berlin A 1108	184. 923	292. 382
	Dec. 6	Asteroid	223. 103	255. 153
		Berlin A 1062	150. 601	231. 722
		Berlin A 1076	244. 273	252. 569
		Berlin A 1079	259. 655	267. 493
(142) Polana	1922 Oct. 25	Asteroid	155. 593	217. 407
		Berlin A 576	125. 826	261. 100
		Leipzig I 603	140. 183	115. 879
		Leipzig I 606	155. 583	157. 244
		Berlin A 583	164. 880	270. 298
(142) Polana (Contd.)	1922 Oct. 27	Asteroid	137. 075	208. 722
		Berlin A 570 Leipzig I 595	116. 651	173. 202
		Berlin A 571	119. 824	210. 611
		Berlin A 573	127. 949	258. 851
		Leipzig I 606	182. 629	165. 479
(145) Adeona	1916 Nov. 1	Asteroid	166. 721	91. 303
		Albany 894	136. 203	67. 461
		Albany 901	157. 724	116. 410
		Albany 905	188. 182	86. 951
	2	Asteroid	170. 202	88. 652
		Albany 887	146. 413	124. 107
		Albany 894	162. 850	65. 487
		Albany 901	184. 494	114. 398
(147) Protogeneia	1915 Nov. 7	Asteroid	214. 172	187. 149
		Leipzig I 627	196. 705	197. 371
		Leipzig I 628	196. 915	193. 813
		Leipzig I 633	240. 024	163. 283
	24	Asteroid	287. 073	203. 197
		Leipzig I 575	253. 875	123. 021
		Leipzig I 585	282. 763	222. 688
		Leipzig I 588	305. 340	158. 117
(148) Gallia	1916 June 26	Asteroid	235. 820	193. 016
		Albany 6394	188. 251	190. 717
		Albany 6402	199. 152	182. 505
		Albany 6421	280. 545	170. 127
(149) Medusa	1917 Nov. 7	Asteroid	191. 550	104. 297
		Berlin A 893	191. 768	82. 698
		Berlin A 895	196. 888	73. 907
		Berlin A 901	215. 783	163. 197
	8	Asteroid	172. 828	217. 975
		Berlin A 888	191. 049	307. 506
		Berlin A 893	197. 759	203. 228
		Berlin A 895	202. 801	194. 422
	1920 Oct. 5	Asteroid	133. 577	49. 632
		Albany 117	94. 044	75. 879
		Albany 120	103. 967	86. 557
		Albany 126	141. 354	42. 553
		Albany 131	157. 894	56. 001
(153) Hilda	1922 Oct. 25	Asteroid	179. 450	155. 086
		Leipzig I 620	132. 679	137. 601
		Leipzig I 629	183. 455	142. 290
		Berlin A 603	194. 550	201. 886
		Leipzig I 630 Berlin A 604	194. 974	163. 076
	27	Asteroid	268. 099	172. 543
		Berlin A 591 Leipzig I 620	250. 654	169. 334
		Berlin A 592	252. 868	207. 326
		Leipzig I 629 Berlin A 601	301. 474	174. 445
		Leipzig I 630 Berlin A 604	312. 799	195. 372
(158) Koronis	1920 Feb. 16	Asteroid	122. 950	214. 100
		Berlin A 3563	80. 566	202. 484
		Berlin A 3584	121. 156	226. 099
		Berlin A 3590	132. 844	187. 120
		Berlin A 3592	138. 772	167. 206
	17	Asteroid	100. 345	209. 095
		Berlin A 3563	75. 503	192. 205
		Berlin A 3567	89. 200	253. 022
		Berlin A 3573	95. 599	159. 119
		Berlin A 3584	116. 042	215. 946

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Name	Date	Catalogue	Measures x	Measures y
(158) Koronis (Contd.)	1923 Nov. 10	Asteroid	173.185	172.447
		Berlin A 735	112.504	185.724
		Berlin A 738	127.835	206.636
		Berlin A 742	160.452	134.724
		Berlin A 745	174.676	251.547
		Berlin A 747	197.773	160.375
		Berlin A 750	199.721	153.201
		Berlin A 753	206.340	162.101
	13	Asteroid	162.153	123.202
		Berlin A 730	130.269	99.450
		Berlin A 731	131.291	161.654
		Berlin A 738	175.947	177.487
		Berlin A 742	208.514	105.580
		Berlin A 747	245.837	131.214
		Berlin A 750	247.774	124.049
(160) Una	1921 Feb. 14	Asteroid	122.847	301.026
		Berlin A 4015	88.328	314.950
		Berlin A 4019	91.976	277.579
		Berlin A 4024	108.595	300.225
		Berlin A 4031	157.684	315.796
	15	Asteroid	135.254	194.657
		Berlin A 4015	122.519	201.599
		Berlin A 4019	126.047	164.272
		Berlin A 4024	142.681	186.872
		Berlin A 4031	191.725	202.302
(161) Athor	1914 Nov. 19	Asteroid	197.410	257.566
		Leiden 1584	165.885	241.392
		Leiden 1593	196.233	260.171
	1921 Oct. 6	Asteroid	106.522	256.258
		Leipzig II 416	109.105	242.381
		Leipzig II 427	59.096	257.456
		Leipzig II 428	58.774	251.355
	8	Asteroid	225.532	181.327
		Leipzig II 397	169.685	206.474
		Leipzig II 403	183.479	190.273
		Leipzig II 416	275.929	198.097
(162) Laurentia	1923 Apr. 16	Asteroid	143.103	149.449
		Leipzig II 5938	91.538	179.404
		Leipzig II 5943	120.348	110.903
		Leipzig II 5954	173.178	165.447
		Leipzig II 5955	175.017	70.830
		Leipzig II 5957	184.717	127.104
	19	Asteroid	190.489	162.881
		Leipzig II 5926	123.373	140.849
		Leipzig II 5931	146.253	213.848
		Leipzig II 5938	174.958	194.804
		Leipzig II 5943	203.696	126.277
		Leipzig II 5954	256.575	180.751
(163) Erigone	1919 Jan. 4	Asteroid	135.299	173.801
		Leipzig I 1671	107.325	182.209
		Leipzig I 1675	117.026	144.805
		Leipzig I 1685	135.951	140.849
		Leipzig I 1691	166.000	166.597
		Leipzig I 1693	171.597	216.027
	6	Asteroid	158.207	176.827
		Leipzig I 1671	162.984	174.851
		Leipzig I 1672	164.708	202.395
		Leipzig I 1675	173.545	137.718
	1923 Mar. 24	Asteroid	130.426	281.814
		Tou. +9° 10^h 52^m, 12 [1]	109.918	281.988
		Tou. +9° 10^h 52^m 14	111.617	278.239
		Tou. +9° 10^h 52^m, 16	121.824	284.582
		Tou. +9° 10^h 52^m, 113	141.745	239.533
		Tou. +9° 10^h 52^m, 23	143.977	306.813
		Tou. +9° 10^h 52^m, 120	161.727	231.598
		Tou. +9° 10^h 52^m, 41	175.898	305.971

Name	Date	Catalogue	Measures x	Measures y
(163) Erigone (Contd.)	1923 Apr. 6	Asteroid [2]	209.950	107.301
		Leipzig I 4113	139.015	70.703
		Leipzig I 4122	183.158	120.718
		Leipzig I 4129	204.463	125.751
		Leipzig II 5607	226.369	65.060
		Leipzig I 4136	234.407	67.959
(167) Urda	1915 Sept. 15	Asteroid	200.675	133.460
		Albany 266 Leipzig II 369	169.534	158.333
		Albany 276	194.519	159.799
		Albany 279	215.492	81.433
	16	Asteroid	258.730	211.049
		Albany 261	216.869	183.293
		Leipzig II 369 Albany 266	243.468	243.521
		Leipzig II 381	268.401	244.919
	Oct. 27	Asteroid	71.861	261.102
		Albany 104	46.536	288.065
		Nicolajew 89	123.118	236.034
		Albany 124	145.682	258.506
	Nov. 1	Asteroid	176.136	326.851
		Nicolajew 74	170.931	330.704
		Nicolajew 77	196.295	320.554
		Nicolajew 83	255.892	271.454
(168) Sibylla	1922 Jan. 30	Asteroid	99.862	194.246
		Leipzig I 3432	67.052	161.165
		Leipzig I 3434	72.948	247.922
		Leipzig I 3436	89.150	252.889
		Leipzig I 3456	163.133	164.249
	31	Asteroid	91.780	228.453
		Leipzig I 3432	76.224	190.296
		Leipzig I 3433	76.568	169.346
		Leipzig I 3434	82.303	277.091
		Leipzig I 3436	98.550	282.001
(169) Zelia	1918 Mar. 2	Asteroid	121.851	83.827
		Leipzig I 3970	66.125	71.235
		Leipzig I 3976	110.251	31.390
		Berlin A 4099	148.897	181.821
		Leipzig I 3988	172.323	76.378
	5	Asteroid	166.802	202.294
		Berlin A 4067	136.054	271.051
		Berlin A 4076	157.070	237.415
		Leipzig I 3970	180.689	173.831
(173) Ino	1917 June 13	Asteroid	216.590	196.315
		Albany 5249	173.157	221.256
		Albany 5251	188.999	174.374
		Albany 5259	239.349	224.896
	18	Asteroid	133.258	302.477
		Nicolajew 3952	110.427	234.554
		Nicolajew 3955	123.996	230.300
		Albany 5246	131.651	315.377
(176) Iduna	1921 June 12	Asteroid	125.395	39.347
		Albany 5515	188.678	57.236
		Albany 5532	140.787	50.901
		Albany 5534	113.810	82.838
		Albany 5540	76.928	104.743
	14	Asteroid	187.343	163.758
		Albany 5515	158.588	137.043
		Albany 5519	169.935	158.218
		Albany 5530	201.828	181.903
		Albany 5532	206.761	143.381
	27	Asteroid	203.950	168.593
		Albany 5476	173.365	172.612
		Albany 5480	193.203	161.620
		Albany 5488	226.959	135.567
		Albany 5489	232.025	224.723

[1] Astrographic Catalogue.

[2] "Gap in star trails."

[The Astronomische Gesellschaft Catalogue positions used for the comparison stars unless otherwise indicated]

Name	Date	Catalogue	Measures x	Measures y
(177) Irma	1923 Oct. 13	Asteroid	178.520	210.324
		Leipzig II 414	137.748	249.277
		Leipzig II 417	151.949	253.152
		Leipzig II 421	171.350	207.754
		Leipzig II 425	182.996	194.001
		Leipzig II 431	218.706	196.402
		Leipzig II 439	235.145	252.449
	17	Asteroid	228.450	198.442
		Leipzig II 399	172.328	162.225
		Leipzig II 401	178.578	200.250
		Leipzig II 402	179.251	144.873
		Leipzig II 407	220.150	250.386
		Leipzig II 413	243.076	175.923
		Leipzig II 414	264.394	263.636
(180) Garumna	1921 Sept. 30	Asteroid	192.431	211.131
		Leipzig II 244	189.588	215.505
		Leipzig II 246	199.431	164.633
		Leipzig II 247 } Albany 180 }	199.537	164.429
		Leipzig II 253	224.138	216.352
		Albany 189 } Leipzig II 255 }	229.615	184.599
	Oct. 1	Asteroid	192.249	203.595
		Leipzig II 233	176.115	263.412
		Leipzig II 235	182.176	223.224
		Albany 172	189.046	157.839
		Leipzig II 246	219.511	165.385
		Albany 180	219.598	165.200
(184) Dejopeja	1915 Oct. 12	Asteroid	194.161	216.745
		Leipzig II 422	191.632	188.701
		Leipzig II 425	203.154	224.589
		Leipzig II 426	206.802	184.497
	27	Asteroid	173.202	175.875
		Leipzig II 350	162.779	142.362
		Leipzig II 353	172.422	196.965
		Leipzig II 368	205.110	176.715
	1918 Mar. 11	Asteroid	279.148	171.698
		Leipzig II 5748	247.248	226.908
		Leipzig II 5752	271.036	224.348
		Albany 4234	273.870	155.001
	15	Asteroid	54.658	221.975
		Leipzig II 5730	33.875	227.941
		Leipzig II 5736	59.702	210.076
		Leipzig II 5747	91.854	228.098
	17	Asteroid	73.936	187.627
		Leipzig II 5715	40.586	190.596
		Leipzig II 5725	79.048	218.853
		Leipzig II 5730	89.454	179.578
(189) Phthia	1920 Sept. 13	Asteroid	70.613	147.502
		Nicolajew 5781	105.749	188.149
		Nicolajew 5782	86.288	156.949
		Nicolajew 5783	57.274	166.948
	14	Asteroid	224.688	218.221
		Nicolajew 5775	177.352	189.597
		Nicolajew 5781	209.126	190.304
		Nicolajew 5782	229.122	221.125
		Nicolajew 5783	257.897	210.596
	1922 Jan. 30	Asteroid	214.235	162.062
		Leipzig I 3197	179.507	181.299
		Leipzig I 3212	224.445	152.850
		Leipzig I 3215	231.251	183.528
		Leipzig I 3216	233.703	147.801
	31	Asteroid	200.218	240.624
		Leipzig I 3196	213.667	297.616
		Leipzig I 3197	213.015	227.907
		Leipzig I 3206	198.413	205.501
		Leipzig I 3212	168.109	256.375
(191) Kolga	1915 Feb. 18	Asteroid	159.581	216.552
		Leipzig II 5359	140.088	179.369
		Leipzig II 5361	146.835	239.030
		Leipzig II 5373	187.300	187.223
	19	Asteroid	219.322	169.896
		Leipzig II 5356	191.926	189.288
		Leipzig II 5359	217.748	120.289
		Leipzig II 5361	224.401	179.868
(194) Prokne	1917 Mar. 24	Asteroid	212.148	296.428
		Leipzig I 4376	201.746	324.776
		Leipzig I 4382	218.448	316.055
		Leipzig I 4383	224.180	292.405
	27	Asteroid	154.298	35.445
		Leipzig I 4365	145.451	57.100
		Leipzig I 4377	200.589	72.803
		Leipzig I 4378	204.136	44.598
(195) Eurykleia	1920 Oct. 5	Asteroid	213.743	247.650
		Albany 135	162.951	261.105
		Albany 145	217.774	275.755
		Albany 147	230.118	198.106
		Albany 148	233.522	226.023
	15	Asteroid	230.750	149.556
		Albany 91	204.925	168.450
		Albany 93	212.562	115.751
		Albany 98	230.696	184.398
		Albany 103	238.263	116.476
(196) Philomela	1923 Apr. 18	Asteroid	219.430	297.816
		Leipzig II 6140	141.018	285.352
		Leipzig II 6142	145.449	277.062
		Leipzig II 6156	207.853	276.006
		Leipzig II 6169	260.833	288.499
		Leipzig II 6171	264.852	248.207
	20	Asteroid	145.624	101.106
		Leipzig II 6138	91.409	135.299
		Leipzig II 6140	97.324	82.835
		Leipzig II 6142	101.773	74.557
		Leipzig II 6146	129.575	159.450
		Leipzig II 6156	164.227	73.726
(198) Ampella	1918 Sept. 9	Asteroid	181.621	136.583
		Leipzig II 11155	156.098	101.052
		Leipzig II 11164	184.149	97.800
		Leipzig II 11175	201.712	175.276
(199) Byblis	1915 Dec. 10	Asteroid	238.612	197.695
		Berlin A 1282	199.521	192.030
		Berlin A 1291	232.609	179.646
		Berlin A 1299	255.117	215.559
(200) Dynamene	1920 Sept. 13	Asteroid	173.965	269.449
		Straszburg 7957	202.603	284.997
		Straszburg 7959	196.750	253.949
		Nicolajew 5773	148.053	241.383
		Straszburg 7972	124.098	253.775
	14	Asteroid	117.699	106.404
		Straszburg 7957	110.533	95.215
		Straszburg 7959	116.996	126.149
		Nicolajew 5773	165.886	137.860
		Nicolajew 5774	167.603	130.413
(201) Penelope	1916 Jan. 2	Asteroid	176.211	192.712
		Berlin A 2058	137.771	181.406
		Berlin A 2069	164.306	217.942
		Berlin A 2083	189.185	187.060

[The Astronomische Gesellschaft Catalogue positions used for the comparison stars unless otherwise indicated]

Name	Date	Catalogue	Measures x	Measures y
(201) Penelope (Con.)	1916 Jan. 24	Asteroid	163.958	181.651
		Berlin A 1854	143.786	178.233
		Berlin A 1856	147.601	189.412
		Berlin A 1876	187.450	193.402
	1917 Mar. 19	Asteroid	130.126	158.944
		Leipzig II 5742	90.104	191.401
		Leipzig II 5753	135.994	155.113
		Leipzig II 5755	147.549	185.051
	22	Asteroid	176.652	169.754
		Leipzig II 5726	133.600	138.787
		Leipzig II 5741	188.540	126.119
		Leipzig II 5742	190.835	171.711
(206) Hersilia	1919 July 25	Asteroid	186.135	119.262
		Alger 8334 [1]	234.690	125.959
		Alger 8343	218.960	177.850
		Alger 8347	213.178	98.495
		Alger 8360	176.474	107.621
		Alger 8365	148.736	168.260
		Alger 8368	135.186	128.461
	30	Asteroid	101.924	289.510
		Alger 8291 [1]	47.730	288.906
		Alger 8299	61.805	277.263
		Alger 8314	103.312	273.760
		Alger 8318	110.298	316.185
		Alger 8322	115.750	260.086
		Alger 8334	148.173	307.124
		Alger 8335	151.926	267.735
	Aug. 2	Asteroid	243.122	164.220
		Alger 8266 [1]	195.446	185.658
		Alger 8281	225.195	114.409
		Alger 8282	228.253	190.434
		Alger 8291	241.604	177.942
		Alger 8297	251.293	146.415
		Alger 8299	255.456	166.267
		Alger 8314	296.607	162.385
	1922 Feb. 24	Asteroid	237.563	116.452
		Berlin A 3858	220.702	116.495
		Berlin A 3860	238.396	155.999
		Leipzig I 3801	237.651	89.252
		Berlin A 3867	256.075	133.188
	27	Asteroid	68.727	208.550
		Berlin A 3844	61.642	183.038
		Berlin A 3854	95.125	200.350
		Berlin A 3858	104.470	183.517
(208) Lacrimosa	1923 Oct. 9	Asteroid	192.251	199.000
		Albany 100	119.470	178.874
		Albany 103	124.770	206.272
		Albany 111	171.877	173.835
		Albany 115	191.577	229.674
		Albany 118	199.178	201.527
		Albany 119	204.350	220.952
	11	Asteroid	183.624	186.573
		Albany 97	142.654	170.451
		Albany 100	148.628	180.777
		Albany 103	153.851	208.187
		Albany 111	201.035	175.882
		Albany 115	220.602	231.793
		Albany 118	228.277	203.667
		Albany 119	233.400	223.110
(211) Isolda	1921 Oct. 22	Asteroid	75.804	175.176
		Leipzig I 271	59.068	110.575
		Leipzig I 275	69.099	217.778
		Leipzig I 284	118.355	196.231
		Leipzig I 288	126.583	160.866
	24	Asteroid	94.779	218.817
		Leipzig I 263	73.115	218.049
		Leipzig I 266	79.632	174.006
		Leipzig I 267	79.857	169.748
		Leipzig I 271	112.918	171.932
(211) Isolda (Contd.)	1921 Oct. 26	Asteroid	79.377	194.149
		Leipzig I 257	29.959	184.579
		Leipzig I 260	71.257	165.550
		Leipzig I 266	97.973	167.300
		Leipzig I 267	98.376	163.125
	Nov. 4	Asteroid	121.191	264.997
		Leipzig I 240	93.788	237.446
		Leipzig I 242	121.499	213.157
		Leipzig I 251	162.868	293.333
		Leipzig I 253	173.758	269.074
(213) Lilaea	1917 Apr. 13	Asteroid	260.262	212.352
		Albany 4756	253.478	255.118
		Albany 4764	292.200	222.328
		Albany 4767	294.697	213.980
	May 10	Asteroid	266.296	314.024
		Albany 4672	222.076	320.576
		Albany 4691	309.093	326.166
		Albany 4692	308.439	303.255
	1921 Feb. 14	Asteroid	203.419	227.356
		Berlin A 4083	185.659	197.117
		Berlin A 4084	197.644	282.454
		Berlin A 4086	200.304	292.374
		Berlin A 4094	230.772	210.001
	15	Asteroid	278.753	114.731
		Berlin A 4073	243.936	133.400
		Berlin A 4079	262.210	169.204
		Berlin A 4080	262.775	82.349
		Berlin A 4083	280.816	73.404
		Berlin A 4084	292.308	158.796
(214) Asehera	1918 Mar. 15	Asteroid	225.751	90.136
		Albany 4259	198.419	116.754
		Albany 4262	214.147	161.399
		Albany 4274	266.597	48.896
	17	Asteroid	240.200	61.393
		Albany 4250	194.597	118.699
		Albany 4251	198.363	45.415
		Albany 4259	256.823	74.121
(219) Thusnelda	1916 Sept. 19	Asteroid	38.605	218.134
		Leipzig II 11509	39.388	241.775
		Leipzig II 11517	53.649	258.262
		Albany 7970	77.547	174.890
	20	Asteroid	135.054	199.430
		Leipzig II 11501	110.200	235.992
		Albany 7970	184.984	179.438
		Albany 7972	189.205	180.248
(225) Henrietta	1915 Oct. 30	Asteroid	157.820	145.274
		Leipzig II 560	128.445	130.852
		Leipzig II 570	180.520	151.752
		Leipzig II 573	193.400	188.503
	Nov. 3	Asteroid	172.408	207.196
		Albany 402	120.650	203.332
		Leipzig II 549	160.053	223.353
		Albany 411	193.428	190.991
(230) Athamantis	1915 July 14	Asteroid	113.037	91.817
		Albany 7682	92.129	104.297
		Albany 7693	132.113	53.272
		Albany 7700	178.659	114.456
	18	Asteroid	150.640	115.308
		Albany 7675	139.211	144.905
		Albany 7679	153.436	157.959
		Albany 7682	167.958	103.160
(232) Russia	1920 Apr. 14	Asteroid	210.712	135.794
		Albany 4610	200.296	109.296
		Albany 4612	225.553	88.905
		Albany 4614	243.637	190.494
		Albany 4617	247.249	124.575

[1] Alger Catalogue (1900).

[The Astronomische Gesellschaft Catalogue positions used for the comparison stars unless otherwise indicated]

Name	Date	Catalogue	Measures x	Measures y
(232) Russia (Contd)	1920 Apr. 21	Asteroid	131.575	254.481
		Albany 4586	73.369	245.714
		Albany 4599	132.657	231.901
		Albany 4602	152.758	299.995
		Albany 4605	159.553	242.491
(233) Asterope	1915 Nov. 27	Asteroid	188.588	167.758
		Berlin A 1102	143.566	109.980
		Berlin A 1104	147.356	177.696
		Berlin A 1111	196.457	189.047
	Dec. 6	Asteroid	240.850	86.070
		Berlin A 1073	206.040	75.556
		Berlin A 1080	260.931	75.273
		Berlin A 1082	267.892	80.434
(234) Barbara	1915 Mar. 13	Asteroid	187.007	116.395
		Berlin A 4310	186.826	73.697
		Berlin A 4311	190.103	116.636
		Berlin A 4318	201.651	67.706
	17	Asteroid	157.280	121.525
		Berlin A 4288	120.119	158.581
		Berlin A 4295	157.070	77.147
		Berlin A 4296	160.451	97.546
	1916 June 22	Asteroid	105.447	222.884
		Nicolajew 4542	74.557	238.481
		Nicolajew 4544	93.384	246.596
		Nicolajew 4557	165.651	191.202
	25	Asteroid	250.899	199.996
		Nicolajew 4528	186.949	187.149
		Nicolajew 4530	210.401	189.871
		Nicolajew 4542	288.200	239.446
(236) Honoria	1916 Mar. 9	Asteroid	124.070	197.914
		Leipzig II 5221	75.304	237.807
		Leipzig II 5231	114.255	228.105
		Leipzig II 5235	135.650	194.143
	11	Asteroid	199.848	183.640
		Leipzig II 5218	173.660	121.902
		Leipzig II 5221	179.508	204.797
		Leipzig II 5231	218.418	194.850
(239) Adrastea	1915 Sept. 15	Asteroid	184.686	172.590
		Leipzig II 365	163.014	168.404
		Albany 266 } Leipzig II 369	169.534	158.333
		Leipzig II 395	241.285	186.279
	16	Asteroid	246.950	246.945
		Leipzig II 365	236.887	253.556
		Leipzig II 369 } Albany 266	243.468	243.521
		Leipzig II 381	268.401	244.919
	Oct. 27	Asteroid	181.061	151.349
		Nicolajew 92	143.015	154.502
		Nicolajew 97	173.351	121.287
		Nicolajew 102	194.007	170.563
	Nov. 1	Asteroid	262.148	236.200
		Nicolajew 92	271.451	280.686
		Nicolajew 95	283.687	201.654
		Nicolajew 97	301.094	246.800
	1922 Jan. 30	Asteroid	223.552	63.361
		Leipzig I 3500	190.252	84.245
		Leipzig I 3504	202.075	100.840
		Leipzig I 3516	265.992	116.896
	31	Asteroid	220.260	107.228
		Leipzig I 3500	206.890	120.379
		Leipzig I 3504	218.630	137.034
		Leipzig I 3510	245.847	73.544
		Leipzig I 3512	249.204	68.615
(240) Vanadis	1919 Oct. 27	Asteroid	281.647	148.592
		Straszburg 29	206.517	170.566
		Straszburg 31	214.997	131.615
		Straszburg 42	290.406	159.054
(241) Germania	1916 Sept. 23	Asteroid	145.339	162.574
		Leipzig II 14	130.246	179.049
		Leipzig II 23	166.902	123.805
		Leipzig II 30	191.403	149.349
	26	Asteroid	214.030	210.791
		Leipzig II 11873	180.954	176.551
		Leipzig II 11874	182.803	162.252
		Leipzig II 14	252.958	250.653
(242) Kriemhild	1917 Aug. 10	Asteroid	201.848	190.881
		Nicolajew 5395	161.998	206.735
		Nicolajew 5398	173.897	203.619
		Nicolajew 5410	217.101	193.845
	13	Asteroid	284.804	130.800
		Nicolajew 5392	265.352	186.247
		Nicolajew 5395	300.616	169.621
		Nicolajew 5398	312.558	166.524
(245) Vera	1916 Oct. 24	Asteroid	265.894	279.359
		Leipzig II 762	236.714	226.199
		Leipzig II 771	276.366	317.968
		Leipzig II 778	296.546	310.865
	26	Asteroid	229.250	274.718
		Leipzig II 749	207.150	298.526
		Leipzig II 752	211.326	287.543
		Leipzig II 766	243.031	292.788
	27	Asteroid	154.549	310.392
		Leipzig II 752	155.867	326.238
		Leipzig II 762	184.805	266.776
		Leipzig II 766	187.549	331.448
	Nov. 1	Asteroid	193.858	290.863
		Leipzig II 728	184.028	275.044
		Leipzig II 733	203.831	294.947
		Leipzig II 738	229.645	250.657
	3	Asteroid	193.579	286.958
		Leipzig II 710	174.994	300.955
		Leipzig II 714	182.728	302.973
		Leipzig II 728	221.549	275.450
	15	Asteroid	215.067	177.162
		Leipzig II 657	193.290	179.187
		Leipzig II 665	237.724	126.680
		Leipzig II 667	242.468	179.162
	16	Asteroid	224.980	172.253
		Leipzig II 657	215.876	173.982
		Leipzig II 665	260.352	121.502
		Leipzig II 667	265.100	174.007
	25	Asteroid	180.671	141.751
		Leipzig II 626	167.797	131.524
		Leipzig II 631	186.449	180.143
		Leipzig II 639	199.859	124.235
	27	Asteroid	172.853	146.224
		Leipzig II 625	172.169	181.504
		Leipzig II 629	188.199	118.138
		Leipzig II 639	205.708	123.325
	Dec. 7	Asteroid	243.268	164.278
		Leipzig II 610	222.901	161.449
		Leipzig II 620	255.018	216.051
		Leipzig II 625	271.431	159.392
	8	Asteroid	250.451	187.853
		Leipzig II 610	229.400	179.776
		Leipzig II 620	261.729	234.251
		Leipzig II 625	277.932	177.525
(248) Lameia	1921 Oct. 22	Asteroid	224.475	212.091
		Leipzig I 450	223.049	237.189
		Leipzig I 451	231.333	203.294
		Leipzig I 459	266.768	228.828
		Leipzig I 461	270.054	209.501

[The Astronomische Gesellschaft Catalogue positions used for the comparison stars unless otherwise indicated]

Name	Date	Catalogue	Measures x	Measures y
(248) Lameia (Contd.)	1921 Oct. 24	Asteroid	97.918	256.695
		Leipzig I 424	65.028	279.138
		Leipzig I 434	96.830	243.252
		Leipzig I 440	112.196	229.728
		Leipzig I 451	147.718	269.724
(250) Bettina	1916 Mar. 23	Asteroid	268.044	225.847
		Leipzig II 6013	192.855	264.704
		Leipzig II 6018	234.778	147.328
		Leipzig II 6027	309.049	213.080
	30	Asteroid	32.751	287.098
		Leipzig II 5998	41.354	249.657
		Leipzig II 6000	44.486	225.602
		Leipzig II 6002	53.136	311.711
	Apr. 9	Asteroid	182.749	191.650
		Leipzig II 5949	163.248	200.079
		Leipzig II 5951	173.512	179.445
		Leipzig II 5959	195.722	186.695
	12	Asteroid	130.846	196.502
		Leipzig II 5947	140.218	200.488
		Leipzig II 5949	159.984	206.370
		Leipzig II 5951	170.204	185.709
(257) Silesia	1916 Oct. 27	Asteroid	228.202	256.204
		Berlin A 727	171.546	297.896
		Berlin A 730	188.002	319.453
		Berlin A 736	222.201	236.803
	28	Asteroid	227.155	195.479
		Berlin A 727	189.446	240.827
		Berlin A 730	205.914	262.364
		Berlin A 736	240.052	179.728
(258) Tyche	1921 Oct. 8	Asteroid	211.729	282.712
		Leipzig I 311	163.439	277.597
		Leipzig I 317	182.923	275.347
		Leipzig I 326	219.626	243.102
		Leipzig I 332	241.055	309.826
	21	Asteroid	96.205	198.849
		Leipzig II 358	64.379	214.550
		Leipzig II 360	66.300	200.992
		Leipzig II 382	110.633	145.698
		Leipzig II 389	134.143	198.793
(259) Aletheia	1916 Nov. 27	Asteroid	281.762	139.608
		Berlin A 1159	279.162	188.509
		Berlin A 1160	279.997	190.738
		Berlin A 1171	312.459	146.536
	Dec. 1	Asteroid	243.777	139.001
		Berlin A 1130	184.151	159.249
		Berlin A 1137	218.199	114.514
		Berlin A 1148	269.515	129.751
(260) Huberta	1915 Feb. 18	Asteroid	192.203	124.095
		Leipzig II 5366	226.728	111.977
		Leipzig II 5375	192.780	140.926
		Leipzig II 5378	185.520	125.475
	19	Asteroid	255.118	196.046
		Leipzig II 5366	236.120	199.939
		Leipzig II 5375	270.439	171.397
		Leipzig II 5378	277.485	186.968
(261) Prymno	1920 Mar. 27	Asteroid	34.798	273.746
		Leipzig II 5928	62.958	270.987
		Leipzig II 5932	65.689	197.996
		Leipzig II 5933	65.458	172.744
	Apr. 14	Asteroid	157.158	250.948
		Leipzig I 4338	137.801	270.320
		Leipzig II 5852	148.443	224.462
		Leipzig II 5857	164.360	213.033
		Leipzig I 4360	253.760	257.739
(268) Adorea	1916 Oct. 17	Asteroid	124.624	191.278
		Albany 359	96.351	172.863
		Albany 361	101.316	209.782
		Albany 367	144.700	207.783
	22	Asteroid	126.466	218.496
		Albany 342	117.701	282.104
		Albany 347	134.016	273.323
		Albany 352	152.353	221.098
	1922 Nov. 21	Asteroid	118.920	267.428
		Berlin A 921 Leipzig I 1011	72.836	245.943
		Berlin A 928	95.846	288.617
		Berlin A 931	123.648	319.349
		Leipzig I 1020	125.251	225.165
	23	Asteroid	168.576	228.770
		Berlin A 916	120.404	253.243
		Berlin A 921 Leipzig I 1011	161.098	216.048
		Berlin A 928	184.354	258.248
		Leipzig I 1020	212.952	195.003
(270) Anahita	1915 Feb. 18	Asteroid	206.736	99.644
		Leipzig II 5377	144.065	56.605
		Leipzig II 5388	206.759	142.714
		Leipzig II 5393	231.471	49.196
	19	Asteroid	241.408	84.001
		Leipzig II 5374	194.179	113.493
		Leipzig II 5377	204.271	30.474
		Leipzig II 5388	265.033	118.031
	Mar. 9	Asteroid	297.082	221.300
		Leipzig II 5271	253.869	224.293
		Leipzig I 3888	308.110	287.068
		Leipzig II 5284	313.453	198.525
(275) Sapientia	1923 Dec. 12	Asteroid	125.548	126.353
		Bord. +14° 4^h 16^m, 33 [1]	106.501	123.884
		Bord. +14° 4^h 16^m, 35	108.728	138.015
		Bord. +14° 4^h 16^m, 39	127.278	100.574
		Bord. +14° 4^h 16^m, 42	142.981	108.900
		Bord. +15° 4^h 20^m, 24	187.574	182.855
	14	Asteroid	185.063	235.432
		Bord. +14° 4^h 16^m, 12 [1]	144.338	231.973
		Bord. +14° 4^h 16^m, 17	164.673	207.399
		Bord. +14° 4^h 16^m, 18	167.140	258.800
		Bord. +14° 4^h 16^m, 25	184.096	221.453
		Bord. +14° 4^h 16^m, 33	207.477	235.058
		Bord. +14° 4^h 16^m, 39	228.397	211.884
(276) Adelheid	1916 May 31	Asteroid	212.506	206.105
		Straszburg 5730	186.376	185.074
		Straszburg 5732	189.343	193.798
		Straszburg 5734	201.396	145.156
	June 3	Asteroid	189.004	178.362
		Nicolajew 4192	178.655	186.245
		Straszburg 5730	216.150	130.124
		Straszburg 5732	219.262	138.774
	1918 Nov. 5	Asteroid	218.940	140.598
		Leipzig II 789	182.995	107.038
		Leipzig II 790	192.074	103.316
		Leipzig II 797	222.132	142.371
	6	Asteroid	156.679	157.399
		Leipzig II 789	137.101	139.910
		Leipzig II 790	146.200	136.175
		Leipzig II 797	176.311	175.151
	1922 June 23	Asteroid	180.724	224.203
		Leipzig II 9056	172.555	194.953
		Leipzig II 9066	199.351	194.552
		Leipzig II 9069	211.560	250.674
		Leipzig II 9073	214.177	250.247

[1] Astrographic Catalogue.

[The Astronomische Gesellschaft Catalogue positions used for the comparison stars unless otherwise indicated]

Name	Date	Catalogue	Measures x	Measures y
(277) Elvira	1919 Sept. 24	Asteroid	109.355	174.956
		Albany 51	83.549	171.617
		Albany 53	93.910	201.592
		Albany 58	116.663	148.148
	25	Asteroid	83.960	163.473
		Albany 51	77.451	168.699
		Albany 55	96.118	105.048
		Albany 58	110.448	145.034
	26	Asteroid	84.890	244.877
		Albany 47	68.205	269.453
		Albany 50	95.984	199.000
		Albany 51	97.400	258.486
		Albany 55	116.171	194.755
		Albany 58	130.473	234.791
	29	Asteroid	62.293	277.083
		Albany 35	47.790	221.290
		Albany 41	72.297	317.549
		Albany 50	131.004	258.552
(279) Thule	1915 Nov. 3	Asteroid	184.846	190.533
		Leipzig I 693	146.145	133.805
		Leipzig I 708	188.741	193.254
		Leipzig I 709	192.727	136.000
	5	Asteroid	162.220	180.210
		Leipzig I 685	101.536	165.750
		Leipzig I 693	152.386	132.444
		Leipzig I 708	195.024	191.842
(287) Nephthys	1920 Feb. 10	Asteroid	217.286	122.647
		Berlin A 3045	202.253	110.141
		Berlin A 3047	218.449	153.436
		Berlin A 3059	233.712	92.959
		Berlin A 3064	247.868	103.587
	13	Asteroid	133.646	75.793
		Berlin A 3026	118.945	67.771
		Berlin A 3032	128.104	58.540
		Berlin A 3034	131.438	75.496
		Berlin A 3035	133.798	86.276
		Berlin A 3040	149.458	73.116
(289) Nenetta	1922 Nov. 10	Asteroid	222.244	235.627
		Leipzig II 920	207.549	240.100
		Leipzig II 921	207.538	287.832
		Leipzig II 924	213.851	199.557
		Leipzig II 930	232.265	231.798
	17	Asteroid	228.286	265.403
		Leipzig II 890	201.164	265.111
		Leipzig II 891	215.890	256.505
		Leipzig II 893	216.707	263.531
		Leipzig II 904	260.952	302.345
		Leipzig II 908	268.797	234.650
(302) Clarissa	1920 Nov. 12	Asteroid	161.212	151.454
		Leipzig I 442	120.166	166.807
		Leipzig I 448	139.538	175.234
		Leipzig I 456	177.472	148.527
		Leipzig I 458	189.021	116.960
	13	Asteroid	135.099	161.624
		Leipzig I 442	109.869	181.500
		Leipzig I 444	112.568	105.807
		Leipzig I 448	129.279	189.818
		Leipzig I 456	167.049	162.875
(303) Josephina	1916 Sept. 25	Asteroid	99.048	140.893
		Albany 29	70.851	96.211
		Albany 33	86.891	164.189
		Albany 34	102.349	188.754
	26	Asteroid	181.902	220.399
		Albany 29	173.618	180.498
		Albany 33	189.549	248.499
		Albany 34	204.971	273.101
(305) Gordonia	1916 Oct. 17	Asteroid	75.281	197.298
		Albany 94	57.521	225.211
		Albany 95	63.144	232.876
		Albany 101	78.365	159.841
	21	Asteroid	160.774	212.969
		Albany 82	119.427	183.381
		Albany 88	179.795	180.156
		Albany 89	182.438	228.964
(306) Unitas	1916 Feb. 7	Asteroid	163.955	219.601
		Berlin A 3349	164.953	248.726
		Berlin A 3350	165.101	249.549
		Berlin A 3354	172.953	198.360
	9	Asteroid	88.200	242.307
		Berlin A 3319	33.763	202.592
		Berlin A 3328	73.267	272.322
		Berlin A 3348	121.543	199.278
(308) Polyxo	1916 Nov. 27	Asteroid	221.249	197.152
		Leipzig I 1149	218.976	220.564
		Leipzig I 1154	239.620	241.690
		Leipzig I 1158	253.594	179.595
	Dec. 1	Asteroid	192.440	178.187
		Leipzig I 1128	161.418	173.869
		Leipzig I 1132	182.256	251.500
		Leipzig I 1135	187.998	247.415
	1918 Mar. 5	Asteroid	114.099	235.151
		Leipzig II 5373	116.497	210.808
		Leipzig II 5375	124.567	253.772
		Leipzig II 5378	131.804	269.282
	11	Asteroid	170.516	163.551
		Leipzig II 5336	134.070	146.098
		Leipzig II 5347	175.947	154.331
		Leipzig II 5349	182.233	158.740
	1919 July 1	Asteroid	129.563	185.848
		Washington 5976	77.200	197.303
		Washington 5982	103.520	178.463
		Washington 5994	182.899	173.943
	2	Asteroid	185.931	159.047
		Washington 5982	172.673	151.725
		Washington 5988	201.123	241.436
		Washington 5994	251.951	146.448
(312) Pierretta	1922 Mar. 23	Asteroid	214.338	262.693
		Leipzig II 5809	162.252	240.710
		Leipzig II 5817	213.603	265.521
		Leipzig II 5819	234.362	242.490
		Leipzig II 5822	247.147	281.449
(322) Phaeo	1916 Feb. 7	Asteroid	161.481	91.125
		Albany 3769	134.744	98.939
		Albany 3776	159.941	123.333
		Albany 3785	180.863	47.501
(323) Brucia	1923 May 23	Asteroid	164.580	256.147
		Albany 5419 Nicolajew 4110	136.376	251.157
		Nicolajew 4121	177.626	205.013
		Albany 5439	188.699	299.442
		Nicolajew 4129	216.546	220.199
		Albany 5445	224.048	267.092
	24	Asteroid	248.955	253.876
		Albany 5413	212.309	285.489
		Nicolajew 4107 Albany 5417	229.075	257.340
		Nicolajew 4110 Albany 5419	247.052	251.199
		Nicolajew 4111 Albany 5422	256.255	244.551

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[The Astronomische Gesellschaft Catalogue positions used for the comparison stars unless otherwise indicated]

Name	Date	Catalogue	Measures x	Measures y
(323) Brucia (Contd.)	1923 May 25	Asteroid	201.370	177.199
		Albany 5402 Nicolajew 4101	145.321	174.092
		Nicolajew 4106	193.645	126.099
		Albany 5417 Nicolajew 4107	208.234	183.548
		Nicolajew 4109	219.144	130.079
		Albany 5419 Nicolajew 4110	226.141	177.236
	June 1	Asteroid	177.858	207.592
		Nicolajew 4071	146.548	166.565
		Nicolajew 4072	147.742	247.626
		Nicolajew 4073	150.250	172.972
		Nicolajew 4075	171.846	246.295
		Nicolajew 4079	186.299	246.744
		Nicolajew 4082	200.788	170.008
		Nicolajew 4083	201.584	231.704
		Nicolajew 4085	204.328	201.484
	4	Asteroid	105.853	157.752
		Nicolajew 4054	153.720	211.510
		Albany 5361 Nicolajew 4055	142.771	106.552
		Albany 5368 Nicolajew 4060	114.309	84.677
		Nicolajew 4067	88.704	217.846
		Nicolajew 4071	59.352	182.026
	9	Asteroid	214.578	256.428
		Nicolajew 4040	162.291	246.384
		Nicolajew 4044	207.127	283.101
		Nicolajew 4046	224.285	274.621
		Nicolajew 4047	247.325	248.746
		Nicolajew 4049	250.501	265.231
	17	Asteroid	187.134	176.202
		Alg. −2° 15^h 52^m, 10 [1] Alg. −1° 15^h 48^m, 76	146.233	151.754
		Alg. −0° 15^h 52^m, 89	151.229	214.901
		Alg. −0° 15^h 52^m, 94	160.473	196.751
		Alg. −0° 15^h 52^m, 104	182.113	230.008
		Alg. −2° 15^h 52^m, 17	198.050	140.499
		Alg. −0° 15^h 52^m, 116	215.412	228.473
		Alg. −1° 15^h 56^m, 76	231.527	149.176
	18	Asteroid	251.260	202.373
		Alg. −1° 15^h 48^m, 45 [1]	175.453	204.168
		Alg. −2° 15^h 52^m, 2 Alg. −2° 15^h 44^m, 32 Alg. −1° 15^h 48^m, 48	178.070	191.431
		Alg. −2° 15^h 52^m, 10 Alg. −1° 15^h 48^m, 76	231.838	187.249
		Alg. −0° 15^h 52^m, 94	245.998	232.241
		Alg. −0° 15^h 52^m, 104	267.598	265.552
		Alg. −2° 15^h 52^m, 17	283.630	176.047
	30	Asteroid	159.805	242.898
		Straszburg 5476	87.248	267.593
		Straszburg 5478	94.351	199.274
		Nicolajew 3988	137.353	316.137
		Straszburg 5490 Nicolajew 3993	165.521	237.048
		Straszburg 5495	192.281	203.749
		Nicolajew 3997	195.523	280.146
(331) Etheridgea	1915 Nov. 7	Asteroid	83.298	239.464
		Berlin A 654	87.718	212.556
		Berlin A 659	98.167	283.039
		Berlin A 661	109.779	198.880
	9	Asteroid	74.301	209.412
		Berlin A 643	42.201	265.107
		Berlin A 644	58.212	128.702
		Berlin A 645	65.103	264.144
	1923 Mar. 24	Asteroid	133.852	216.548
		Leipzig II 5908	105.139	206.311
		Leipzig II 5916	132.276	242.843
		Leipzig II 5917	133.453	209.401
		Leipzig II 5921	142.248	195.383
		Leipzig II 5922	151.924	244.102
		Leipzig II 5926	180.878	232.353
(334) Chicago	1916 Oct. 24	Asteroid	202.106	102.350
		Leipzig II 742	167.851	163.052
		Albany 565	265.001	59 046
		Albany 566	268.993	64.297
(334) Chicago (Con.)	1916 Oct. 26	Asteroid	130.501	95.307
		Leipzig II 742	126.398	167.225
		Leipzig II 753	178.999	176.707
		Leipzig II 756	187.596	178.955
	27	Asteroid	158.190	128.428
		Leipzig II 709	62.923	194.854
		Leipzig II 717	81.818	180.207
		Leipzig II 742	168.854	205.645
	Nov. 1	Asteroid	186.803	94.656
		Albany 526	162.162	110.407
		Albany 528	167.475	93.301
		Albany 532	187.323	119.224
	3	Asteroid	166.946	85.202
		Albany 522	148.803	63.226
		Albany 526	171.255	110.888
		Albany 528	176.578	93.753
		Albany 532	196.440	119.699
(335) Roberta	1916 Dec. 2	Asteroid	150.083	188.188
		Berlin A 1296	135.734	265.090
		Leipzig I 1374	136.097	173.949
		Leipzig I 1377	163.898	237.493
	22	Asteroid	225.248	145.002
		Leipzig I 1296	183.938	124.064
		Leipzig I 1305	234.602	181.509
		Leipzig I 1310	265.705	131.706
	1922 Mar. 17	Asteroid	89.403	328.444
		Leipzig II 5664	106.328	298.603
		Leipzig II 5665	108.291	273.248
		Leipzig II 5666	113.458	327.960
	22	Asteroid	72.699	273.698
		Leipzig I 4156	76.244	277.810
		Leipzig I 4157	76.620	275.094
		Leipzig I 4161	84.974	267.899
		Leipzig I 4162	91.550	270.726
(339) Dorothea	1916 Mar. 11	Asteroid	188.601	200.208
		Albany 4320	140.019	219.000
		Albany 4324	170.982	196.809
		Albany 4326	192.378	185.302
(340) Eduarda	1915 Nov. 7	Asteroid	99.300	138.304
		Berlin A 657	89.6[illegible]9	148.486
		Berlin A 658	91.672	129.962
		Berlin A 667	134.641	97.702
	9	Asteroid	48.457	127.852
		Berlin A 644	19.458	148.754
		Berlin A 651	63.196	141.244
		Berlin A 653	66.992	124.846
(341) California	1915 Nov. 7	Asteroid	264.573	307.146
		Berlin A 704	247.049	310.055
		Berlin A 706	257.015	311.586
		Berlin A 709	295.262	304.520
	9	Asteroid	222.770	283.792
		Berlin A 691	186.084	249.052
		Berlin A 696	209.009	339.711
		Berlin A 704	259.142	293.444
(342) Endymion	1918 Jan. 10	Asteroid	114.489	266.512
		Berlin A 1405	103.064	244.398
		Berlin A 1411	131.527	286.998
		Berlin A 1416	147.295	249.273
	15	Asteroid	104.981	213.082
		Berlin A 1388	59.877	201.831
		Berlin A 1398	101.727	269.461
		Berlin A 1402	125.515	261.650
		Berlin A 1405	141.608	201.575

[1] Astrographic Catalogue.

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Name	Date	Catalogue	Measures x	Measures y
(344) Desiderata	1917 Nov. 6	Asteroid	198.405	290.318
		Leipzig II 847	164.124	257.453
		Leipzig II 856	211.306	231.624
		Leipzig II 864	231.254	306.996
	6	Asteroid	162.972	132.542
		Leipzig II 847	127.375	99.830
		Leipzig II 851	137.842	168.975
		Leipzig II 862	186.015	171.011
	8	Asteroid	216.747	242.248
		Leipzig II 842	189.673	173.486
		Leipzig II 847	232.946	203.679
		Leipzig II 851	244.825	272.630
(345) Tercidina	1920 Sept. 13	Asteroid	121.238	130.074
		Leipzig II 11554	82.851	104.849
		Leipzig II 11565	123.285	111.100
		Leipzig II 11571	144.704	116.648
		Leipzig II 11573	146.838	156.883
	14	Asteroid	180.554	160.599
		Leipzig II 11554	162.728	150.622
		Leipzig II 11560	176.746	130.272
		Leipzig II 11565	203.184	156.640
		Leipzig II 11571	224.601	162.047
(352) Gisela	1916 Mar. 10	Asteroid	84.246	191.903
		Leipzig II 5405	48.838	239.079
		Leipzig II 5408	63.800	246.892
		Leipzig II 5422	121.553	186.751
	23	Asteroid	66.150	199.525
		Leipzig II 5364	64.111	173.438
		Leipzig II 5367	80.953	217.301
		Leipzig II 5368	80.889	166.599
(357) Ninina	1922 May 15	Asteroid	206.797	310.649
		Leipzig II 6815	155.688	228.898
		Leipzig II 6816	158.344	320.577
		Leipzig II 6817	160.133	240.393
		Leipzig II 6825	214.344	226.826
	19	Asteroid	240.017	257.936
		Leipzig II 6809	223.847	200.627
		Leipzig II 6812	243.074	298.055
		Leipzig II 6816	256.850	257.799
		Leipzig II 6817	260.445	177.676
(358) Apollonia	1917 Jan. 16	Asteroid	238.383	109.991
		Berlin A 3301	217.630	89.852
		Berlin A 3304	222.901	102.648
		Berlin A 3307	229.850	126.924
	19	Asteroid	216.524	42.919
		Berlin A 3275	195.604	43.849
		Berlin A 3280	218.948	87.452
		Berlin A 3294	249.273	40.807
(361) Bononia	1914 Oct. 22	Asteroid	88.179	165.276
		Berlin B 798	54.254	118.909
		Berlin B 807	105.760	171.364
(363) Padua	1916 Mar. 30	Asteroid	197.908	190.993
		Leipzig II 6037	188.852	189.057
		Leipzig II 6045	241.349	244.902
		Leipzig II 6048	250.672	246.024
	Apr. 9	Asteroid	303.726	135.542
		Leipzig II 5998	267.444	150.649
		Leipzig II 6000	271.147	126.700
		Leipzig II 6010	313.521	87.641
	12	Asteroid	269.778	158.458
		Leipzig II 5993	246.100	147.456
		Leipzig II 5998	283.845	161.605
		Leipzig II 6000	287.465	137.640
(364) Isara	1923 Apr. 21	Asteroid	130.291	185.258
		Albany 4734	114.439	182.340
		Albany 4736	125.619	214.197
		Albany 4741	158.241	151.723
		Albany 4743	167.743	241.948
		Albany 4747	203.966	170.445
(367) Amicitia	1914 Oct. 19	Asteroid	143.446	230.402
		Leipzig II 849	135.559	275.176
		Leipzig II 863	190.101	167.310
	21	Asteroid	116.340	199.375
		Leipzig II 834	53.239	166.371
		Leipzig II 849	158.714	257.896
(368) Haidea	1921 Oct. 22	Asteroid	268.677	232.744
		Leipzig I 312	212.904	244.619
		Leipzig I 327	273.600	296.072
		Leipzig I 331	289.038	254.745
		Leipzig I 332	289.445	214.905
	24	Asteroid	248.307	271.974
		Leipzig I 311	224.769	245.390
		Leipzig I 312	224.801	308.646
		Leipzig I 317	244.406	243.550
		Leipzig I 332	302.132	279.489
	26	Asteroid	276.497	239.901
		Leipzig I 309	278.248	243.770
		Leipzig I 310	281.974	189.069
		Leipzig I 311	283.797	237.800
		Leipzig I 315	290.750	194.698
	Nov. 4	Asteroid	197.147	281.423
		Leipzig I 271	173.574	311.680
		Leipzig I 272	173.593	267.098
		Leipzig I 282	230.737	286.169
		Leipzig I 285	232.152	275.803
(371) Bohemia	1916 Sept. 19	Asteroid	85.557	99.873
		Leipzig II 11583	42.244	116.605
		Leipzig II 11596	84.049	140.952
		Leipzig II 11601	108.394	80.897
	20	Asteroid	82.900	153.150
		Leipzig II 11583	58.278	177.447
		Leipzig II 11596	100.035	201.837
		Leipzig II 11601	124.452	141.815
(374) Burgundia	1916 Sept. 19	Asteroid	122.120	164.286
		Albany 7970	77.551	174.866
		Albany 7972	81.786	175.657
		Albany 7987	146.055	143.343
	20	Asteroid	213.118	157.397
		Albany 7970	184.948	179.447
		Albany 7972	189.181	180.252
		Albany 7987	253.519	148.127
	1921 Oct. 22	Asteroid	69.345	215.509
		Leipzig I 353	82.402	202.663
		Leipzig I 354	81.835	239.530
		Leipzig I 363	32.572	217.179
	24	Asteroid	87.231	177.842
		Leipzig I 349	99.037	220.849
		Leipzig I 353	64.192	140.072
		Leipzig I 354	63.534	177.130
	26	Asteroid	76.415	227.226
		Leipzig I 334	125.941	218.645
		Leipzig I 342	99.909	239.897
		Leipzig I 349	53.667	245.955
	Nov. 4	Asteroid	58.402	166.312
		Leipzig I 306	77.945	138.806
		Leipzig I 308	75.048	135.543
		Leipzig II 411	64.951	167.796
		Leipzig I 314	57.229	142.097

[The Astronomische Gesellschaft Catalogue positions used for the comparison stars unless otherwise indicated]

Name	Date	Catalogue	Measures x	Measures y
(375) Ursula	1918 Mar. 2	Asteroid	153. 078	217. 547
		Berlin A 3989	164. 106	294. 498
		Berlin A 3992	169. 297	158. 349
		Berlin A 3995	179. 593	174. 749
	5	Asteroid	184. 816	141. 640
		Berlin A 3972	168. 254	119. 461
		Berlin A 3975	180. 552	175. 347
		Berlin A 3979	191. 970	128. 007
(376) Geometria	1916 Mar. 4	Asteroid	76. 557	207. 174
		Leipzig I 3540	41. 816	166. 658
		Berlin A 3525	46. 000	227. 457
		Leipzig I 3552	93. 126	145. 245
(377) Campania	1915 Oct. 9	Asteroid	163. 143	124. 025
		Leipzig II 171	152. 744	145. 291
		Leipzig II 180	185. 642	148. 719
		Leipzig II 185	207. 928	93. 794
	10	Asteroid	212. 759	159. 689
		Leipzig II 157	183. 965	119. 732
		Leipzig II 166	205. 057	183. 649
		Leipzig II 171	219. 871	193. 608
	11	Asteroid	283. 291	197. 530
		Leipzig II 157	271. 069	169. 623
		Leipzig II 162	281. 993	234. 388
		Leipzig II 166	292. 141	233. 603
	25	Asteroid	263. 813	249. 755
		Albany 62	233. 478	231. 378
		Albany 70	274. 427	286. 293
		Albany 71	283. 005	278. 330
	27	Asteroid	196. 678	185. 176
		Albany 62	190. 922	189. 253
		Albany 70	231. 557	244. 372
		Albany 71	240. 175	236. 455
	Nov. 1	Asteroid	190. 159	264. 221
		Albany 54	179. 049	267. 149
		Albany 56	187. 901	277. 059
		Albany 62	237. 117	320. 608
	5	Asteroid	273. 654	190. 588
		Albany 39	215. 400	190. 901
		Albany 49	269, 997	226. 993
		Albany 53	287. 998	164. 294
(378) Holmia	1916 Nov. 18	Asteroid	251. 633	182. 977
		Berlin A 838	238. 240	150. 976
		Berlin A 840	248. 546	217. 352
		Berlin A 844	270. 049	116. 466
	25	Asteroid	169. 446	131. 600
		Berlin A 815	127. 493	166. 702
		Berlin A 821	181. 701	173. 429
		Berlin A 825	215. 311	158. 199
(379) Huenna	1919 July 25	Asteroid	125. 055	156. 454
		Alg. 8281 [1]	78. 187	161. 297
		Alg. 8284	81. 652	118. 145
		Alg. 8291	94. 028	225. 457
		Alg. 8299	108. 123	213. 863
		Alg. 8312	143. 685	136. 680
		Alg. 8314	149. 630	210. 388
		Alg. 8322	162. 106	196. 779
	30	Asteroid	98. 862	223. 224
		Alg. 8228 [1]	23. 586	224. 243
		Alg. 8235	40. 191	227. 096
		Alg. 8257	95. 559	186. 310
		Alg. 8268	110. 992	221. 302
		Alg. 8278	133. 593	187. 788
		Alg. 8281	139. 563	244. 207
		Alg. 8284	142. 435	201. 051
	Aug. 2	Asteroid	137. 082	84. 388
		Alg. 8215 [1]	86. 395	45. 658
		Alg. 8228	110. 073	94. 296
		Alg. 8230	111. 974	47. 260
		Alg. 8235	126. 570	97. 165
		Alg. 8247	156. 233	98. 979
		Alg. 8252	170. 248	36. 097
		Alg. 8257	181. 576	56. 813

Name	Date	Catalogue	Measures x	Measures y
(380) Fiducia	1917 Apr. 13	Asteroid	199. 751	92. 628
		Nicolajew 3599	199. 908	144. 547
		Nicolajew 3611	279. 674	99. 079
		Nicolajew 3612	281. 996	74. 850
	May 10	Asteroid	168. 054	146. 949
		Albany 4666	152. 803	234. 154
		Albany 4668	177. 912	167. 951
		Albany 4670	184. 670	145. 044
(382) Dodona	1914 Nov. 19	Asteroid	81. 690	171. 130
		Leiden 1529	28. 244	174. 068
		Leiden 1554	93. 298	164. 990
(384) Burdigala	1914 Nov. 17	Asteroid	120. 069	111. 887
		Berlin A 854	111. 278	143. 502
		Berlin A 863	148. 504	84. 023
(385) Ilmatar	1918 Mar. 11	Asteroid	150. 277	238. 737
		Leipzig II 5682	119. 997	221. 938
		Leipzig II 5686	147. 923	274. 472
		Leipzig II 5695	179. 091	231. 065
	1920 Sept. 15	Asteroid	84. 748	189. 845
		Albany 8157	84. 425	228. 882
		Albany 8158	85. 355	215. 380
		Albany 8162	118. 642	162. 551
		Albany 8164	126. 501	182. 450
(387) Aquitania	1915 Dec. 31	Asteroid	215. 245	166. 190
		Leipzig I 2716	208. 898	176. 271
		Leipzig I 2719	210. 335	168. 776
		Leipzig I 2722	213. 478	157. 974
	1916 Jan. 2	Asteroid	248. 957	182. 752
		Leipzig I 2687	228. 398	136. 556
		Leipzig I 2698	244. 855	142. 904
		Leipzig I 2709	266. 703	191. 584
(388) Charybdis	1912 Oct. 1	Asteroid	211. 810	301. 752
		Leipzig II 250	229. 945	310. 455
		Leipzig II 257	199. 538	266. 235
	4	Asteroid	261. 740	323. 654
		Leipzig II 237	263. 221	342. 913
		Leipzig II 239	251. 610	322. 283
		Leipzig II 250	219. 015	316. 415
	7	Asteroid	280. 630	312. 952
		Leipzig II 216	310. 850	307. 248
		Leipzig II 237	221. 317	317. 062
		Leipzig II 239	210. 520	296. 008
(393) Lampetia	1917 Oct. 16	Asteroid	269. 645	165. 450
		Leipzig I 590	265. 281	91. 413
		Leipzig I 592	278. 414	118. 904
		Leipzig I 594	283. 999	181. 425
	17	Asteroid	277. 228	168. 322
		Leipzig I 584	247. 578	184. 211
		Leipzig I 587	269. 777	117. 197
		Leipzig I 590	294. 362	113. 011
(401) Ottilia	1916 Oct. 17	Asteroid	150. 991	275. 149
		Leipzig II 470	118. 610	318. 679
		Albany 367	144. 694	207. 747
		Albany 371	183. 236	277. 027
	22	Asteroid	150. 557	304. 148
		Albany 342	117. 048	272. 235
		Albany 347	133. 384	263. 448
		Albany 353	153. 716	343. 778

[1] Alger Catalogue (1900).

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Name	Date	Catalogue	Measures x	Measures y
(402) Chloë	1919 Jan. 6	Asteroid	108.501	127.809
		Leipzig I 1771	100.917	98.773
		Leipzig I 1778	120.376	98.720
		Leipzig I 1780	124.965	137.004
	7	Asteroid	129.401	214.630
		Leipzig I 1754	93.861	282.765
		Leipzig I 1771	141.663	175.141
		Leipzig I 1780	165.501	213.504
(403) Cyane	1915 Sept. 12	Asteroid	203.358	166.066
		Albany 7673	170.827	241.727
		Albany 7680	206.230	104.181
		Albany 7688	234.861	150.880
(407) Arachne	1916 Sept. 19	Asteroid	234.900	175.195
		Leipzig II 11625	194.454	163.108
		Leipzig II 11628	203.272	163.801
		Leipzig II 11633	240.347	144.949
	20	Asteroid	230.795	229.679
		Leipzig II 11625	210.370	224.098
		Leipzig II 11628	219.199	224.797
		Leipzig II 11633	256.266	206.000
(409) Aspasia	1916 Dec. 29	Asteroid	124.001	139.246
		Leipzig I 2458	74.063	104.349
		Leipzig I 2461	83.083	125.447
		Leipzig I 2485	136.759	151.202
	30	Asteroid	217.255	187.470
		Leipzig I 2458	191.499	156.349
		Leipzig I 2461	200.598	177.400
		Leipzig I 2485	254.402	202.924
(413) Edburga	1923 May 23	Asteroid	150.074	157.923
		Nicolajew 4098	103.680	209.848
		Nicolajew 4103	144.753	130.876
		Nicolajew 4104	145.994	137.555
		Nicolajew 4105	168.098	111.123
		Nicolajew 4106	173.751	208.348
	24	Asteroid	209.281	170.269
		Nicolajew 4098	188.701	223.100
		Nicolajew 4100	206.873	136.679
		Nicolajew 4103	229.449	144.048
		Nicolajew 4104	230.730	150.710
		Nicolajew 4106	258.712	221.406
	25	Asteroid	179.625	111.300
		Nicolajew 4088	118.681	138.111
		Nicolajew 4092	126.198	101.390
		Nicolajew 4098	184.726	165.339
		Nicolajew 4100	203.515	79.029
		Nicolajew 4103	226.032	86.539
		Nicolajew 4104	227.268	93.242
	June 1	Asteroid	99.375	111.925
		Nicolajew 4054	52.468	136.466
		Nicolajew 4056	67.945	96.092
		Nicolajew 4059	91.536	94.952
		Nicolajew 4066	111.123	123.414
		Nicolajew 4067	117.412	130.595
		Nicolajew 4069	124.953	76.342
		Nicolajew 4070	136.900	103.113
	4	Asteroid	183.972	249.423
		Nicolajew 4045	237.452	274.885
		Nicolajew 4047	199.504	198.556
		Nicolajew 4051	167.302	255.150
		Nicolajew 4054	153.720	211.507
		Nicolajew 4056	138.479	252.014
	9	Asteroid	136.802	170.677
		Nicolajew 4031	84.350	227.285
		Nicolajew 4037	128.621	133.245
		Nicolajew 4038	146.535	207.225
		Nicolajew 4040	162.290	246.377
		Nicolajew 4041	165.360	126.546
		Nicolajew 4045	208.422	172.898
(413) Edburga (Con.)	1923 June 17	Asteroid	183.103	101.115
		Alg. −2° 15h 44m, 26 [1]	137.053	63.049
		Alg. −2° 15h 44m, 30 } Alg. −1° 15h 48m, 147	157.681	60.848
		Alg. −2° 15h 44m, 32 } Alg. −1° 15h 48m, 48 } Alg. −2° 15h 52m, 2	163.365	161.127
		Alg. −2° 15h 52m, 4 } Alg. −1° 15h 48m, 152	168.673	94.273
		Alg. −2° 15h 52m, 9	209.805	85.460
		Alg. −2° 15h 52m, 10 } Alg. −1° 15h 48m, 76	217.172	157.061
		Alg. −2° 15h 52m, 11	219.114	64.589
	18	Asteroid	176.602	122.514
		Alg. −2° 15h 44m, 26 [1]	151.570	93.467
		Alg. −2° 15h 44m, 30 } Alg. −1° 15h 48m, 147	172.196	91.203
		Alg. −2° 15h 44m, 32 } Alg. −2° 15h 52m, 2 } Alg. −1° 15h 48m, 48	178.054	191.442
		Alg. −2° 15h 52m, 4 } Alg. −1° 15h 48m, 152	183.227	124.588
		Alg. −2° 15h 52m, 9	224.339	115.702
		Alg. −2° 15h 52m, 10 } Alg. −1° 15h 48m, 76	231.844	187.259
		Alg. −2° 15h 52m, 11	233.603	94.822
	30	Asteroid	93.918	164.100
		Straszburg 5473	71.401	109.704
		Straszburg 5478	94.351	199.269
		Straszburg 5479	96.027	119.300
		Straszburg 5484	138.944	109.401
(415) Palatia	1919 Jan. 6	Asteroid	231.650	248.298
		Berlin A 1919	226.053	236.994
		Berlin A 1927	245.197	288.349
		Berlin A 1934	258.161	247.163
	7	Asteroid	216.441	137.853
		Berlin A 1906	207.430	109.588
		Berlin A 1911	213.008	170.916
		Berlin A 1919	227.535	115.255
(416) Vaticana	1921 Nov. 29	Asteroid	128.700	176.749
		Berlin A 835	128.527	248.404
		Berlin A 839	132.857	129.645
		Berlin A 841	143.762	239.396
		Berlin A 842	146.852	159.555
	Dec. 3	Asteroid	134.825	184.664
		Berlin A 820	94.549	157.071
		Berlin A 829	173.842	260.451
		Berlin A 830	174.045	270.336
(418) Alemannia	1923 Jan. 19	Asteroid	204.772	218.476
		Leipzig I 3139	167.895	238.123
		Leipzig I 3140	171.449	236.230
		Leipzig I 3150	204.150	205.657
		Leipzig I 3152	208.622	224.827
		Leipzig I 3164	235.500	232.836
	22	Asteroid	200.482	236.625
		Leipzig I 3112	142.258	215.724
		Leipzig I 3116	145.297	229.910
		Leipzig I 3132	204.556	239.156
		Leipzig I 3139	233.349	248.696
		Leipzig I 3140	236.950	246.821
(419) Aurelia	1917 Sept. 19	Asteroid	228.596	185.514
		Leipzig II 139	184.186	174.201
		Leipzig II 141	196.802	148.350
		Leipzig II 150	224.051	186.484
	22	Asteroid	247.673	149.002
		Leipzig II 129	219.000	187.001
		Leipzig II 139	265.823	170.198
		Leipzig II 141	278.797	144.498

[1] Astrographic Catalogue.

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Name	Date	Catalogue	Measures x	Measures y
(420) Bertholda	1915 Sept. 8	Asteroid	158.260	148.207
		Albany 8019	113.742	173.660
		Albany 8028	144.251	192.366
		Albany 8030	170.611	93.670
	12	Asteroid	192.423	154.734
		Albany 8004	156.124	108.575
		Albany 8005	161.132	153.121
		Albany 8019	212.405	206.910
	13	Asteroid	188.601	286.073
		Albany 8004	169.032	246.888
		Albany 8005	173.753	291.475
		Albany 8011	203.208	296.001
(425) Cornelia	1915 Nov. 9	Asteroid	247.501	245.655
		Berlin A 893	226.491	171.912
		Berlin A 895	231.701	163.180
		Berlin A 901	249.970	252.616
	10	Asteroid	128.659	249.055
		Berlin A 888	120.056	283.346
		Berlin A 893	125.748	179.002
		Berlin A 901	151.443	259.037
(429) Lotis	1918 Nov. 27	Asteroid	182.295	199.989
		Leipzig I 776	172.999	232.776
		Leipzig I 783	194.471	190.898
		Leipzig I 788	218.243	242.201
	30	Asteroid	209.938	152.431
		Leipzig I 764	180.666	157.220
		Leipzig I 766	194.501	107.896
		Leipzig I 783	260.764	176.559
(433) Eros	1921 Nov. 21	Asteroid	213.204	188.553
		Leipzig II 11252	158.598	175.560
		Leipzig II 11258	186.826	208.447
		Leipzig II 11265	202.355	138.363
		Leipzig II 11266	218.514	210.598
	22	Asteroid	113.445	184.702
		Leipzig II 11266	86.158	205.955
		Leipzig II 11272	110.215	116.774
		Leipzig II 11278	134.900	139.759
		Leipzig II 11280	159.922	186.500
	25	Asteroid	166.039	219.816
		Leipzig II 11288	144.346	262.995
		Leipzig II 11292	153.928	232.800
		Leipzig II 11297	164.274	173.731
		Leipzig II 11309	220.053	174.801
	Dec. 3	Asteroid	302.627	169.662
		Leipzig II 11362	237.828	215.401
		Leipzig I 9070	261.958	249.949
		Leipzig II 11375	290.753	130.090
(440) Theodora	1916 Feb. 7	Asteroid	82.806	220.822
		Berlin A 3518	39.735	159.059
		Berlin A 3524	68.611	250.177
		Berlin A 3532	83.608	128.133
(441) Bathilde	1916 Sept. 19	Asteroid	270.151	233.451
		Leipzig II 11379	250.222	275.325
		Albany 7874	284.663	174.099
		Albany 7876	286.596	207.443
	20	Asteroid	192.082	130.198
		Leipzig II 11371	145.079	177.407
		Leipzig II 11379	188.351	181.495
		Albany 7876	225.132	113.222
(442) Eichsfeldia	1917 Feb. 24	Asteroid	249.305	205.203
		Leipzig I 3988	234.098	192.784
		Berlin A 4110	253.927	263.940
		Berlin A 4114	263.689	264.733
(442) Eichsfeldia (Con.)	1917 Mar. 12	Asteroid	176.390	162.080
		Berlin A 4031	169.702	203.638
		Berlin A 4032	179.187	135.055
		Berlin A 4044	225.951	185.624
(446) Aeternitas	1916 Mar. 31	Asteroid	205.049	102.202
		Albany 4662	191.697	112.709
		Nicolajew 3553	243.556	45.638
		Albany 4670	249.693	148.159
	Apr. 10	Asteroid	49.499	151.754
		Albany 4630	21.507	130.972
		Albany 4633	66.403	241.085
		Albany 4635	67.456	227.811
(447) Valentine	1917 Mar. 19	Asteroid	193.524	193.647
		Leipzig I 4154	197.845	172.399
		Berlin A 4310	215.678	213.710
		Berlin A 4318	230.533	207.800
	22	Asteroid	226.335	138.875
		Berlin A 4286	179.054	172.136
		Berlin A 4295	220.750	195.250
		Leipzig I 4154	279.342	102.180
(451) Patientia	1915 Nov. 27	Asteroid	80.211	129.605
		Leipzig I 1245	43.902	130.398
		Leipzig I 1246	54.906	134.628
		Leipzig I 1251	117.899	161.465
	30	Asteroid	61.072	158.811
		Leipzig I 1235	48.600	138.002
		Leipzig I 1245	90.934	146.299
		Leipzig I 1246	101.827	150.686
(455) Bruchsalia	1917 May 12	Asteroid	241.508	108.802
		Albany 4821	168.902	114.051
		Albany 4824	187.301	132.004
		Nicolajew 3668	275.500	51.802
	14	Asteroid	297.635	73.749
		Albany 4821	263.798	78.062
		Albany 4824	282.276	95.953
		Nicolajew 3659	291.167	30.197
(465) Alekto	1923 Feb. 19	Asteroid	185.438	218.274
		Leipzig I 3712	122.420	191.415
		Leipzig I 3713	123.450	210.494
		Leipzig I 3719	158.928	228.404
		Leipzig I 3733	222.574	254.404
		Leipzig I 3736	229.672	170.303
	21	Asteroid	158.403	181.155
		Leipzig I 3710	132.703	223.100
		Leipzig I 3712	134.668	145.492
		Leipzig I 3713	135.748	164.526
		Leipzig I 3719	171.352	182.384
		Leipzig I 3724	192.109	127.945
(466) Tisiphone	1913 Jan. 1	Asteroid	186.073	216.010
		Camb. Eng. 3400	162.184	222.062
		Camb. Eng. 3406	172.555	180.812
		Camb. Eng. 3426	198.085	189.064
	4	Asteroid	115.521	242.006
		Camb. Eng. 3365	103.958	228.761
		Camb. Eng. 3400	153.947	267.660
		Camb. Eng. 3406	162.370	225.935
	15	Asteroid	136.492	205.405
		Camb. Eng. 3233	117.787	184.202
		Camb. Eng. 3246	133.823	168.783
		Camb. Eng. 3248	135.872	232.086
(468) Lina	1921 Oct. 28	Asteroid	230.303	229.493
		Leipzig II 548	197.546	238.745
		Leipzig II 554	220.307	259.104
		Leipzig II 566	261.981	268.824
		Leipzig II 567	268.675	196.149

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Name	Date	Catalogue	Measures x	Measures y
(468) Lina (Contd.)	1921 Nov. 7	Asteroid	157.322	153.254
		Leipzig II 492	127.640	129.745
		Leipzig II 495	136.051	173.549
		Leipzig II 504	147.609	165.976
		Leipzig II 519	188.853	150.697
(469) Argentina	1915 Sept. 15	Asteroid	235.805	188.793
		Albany 8156	192.554	184.930
		Albany 8166	245.571	157.745
		Albany 8169	264.833	197.540
	16	Asteroid	218.052	187.145
		Albany 8156	193.307	187.152
		Albany 8166	246.221	159.875
		Albany 8169	265.570	199.603
(471) Papagena	1922 Dec. 12	Asteroid	171.427	172.525
		Berlin A 1159	144.676	216.275
		Berlin A 1160	145.525	218.499
		Berlin A 1171	177.102	173.677
		Berlin A 1174	188.010	133.350
(479) Caprera	1916 Feb. 7	Asteroid	292.272	194.160
		Berlin A 3602	295.408	178.147
		Berlin A 3604	301.458	173.439
		Berlin A 3607	305.319	202.169
(483) Seppina	1917 Aug. 18	Asteroid	78.900	195.700
		Nicolajew 5618	66.720	181.309
		Nicolajew 5627	129.550	195.100
		Nicolajew 5628	133.686	212.638
	20	Asteroid	163.099	164.997
		Nicolajew 5606	113.687	187.518
		Nicolajew 5611	148.171	202.651
		Nicolajew 5618	182.925	175.851
	1922 May 24	Asteroid	242.207	195.553
		Albany 5232	206.952	197.067
		Albany 5234	231.477	145.412
		Albany 5235	241.137	232.652
		Albany 5236	241.854	211.608
	29	Asteroid	166.805	210.766
		Leipzig II 6997	174.791	292.489
		Albany 5226	175.135	181.120
		Albany 5227	176.485	180.878
		Albany 5231	202.071	210.833
(485) Genua	1917 Aug. 10	Asteroid	46.795	268.700
		Nicolajew 5363	55.404	252.846
		Nicolajew 5365	64.997	304.978
		Nicolajew 5369	80.250	274.861
	13	Asteroid	66.706	216.153
		Nicolajew 5346	36.395	270.652
		Nicolajew 5355	95.055	183.966
		Nicolajew 5358	109.047	201.601
	15	Asteroid	86.905	42.246
		Nicolajew 5341	60.698	88.355
		Nicolajew 5345	87.901	45.748
		Nicolajew 5346	96.452	116.451
	1922 Sept. 23	Asteroid	153.903	187.202
		Albany 8054	131.282	192.429
		Albany 8059	161.529	118.135
		Albany 8061	178.278	170.822
		Albany 8063	186.169	183.736
	25	Asteroid	149.930	213.493
		Albany 8042	121.371	193.999
		Albany 8046	135.956	254.399
		Albany 8049	143.216	179.942
		Albany 8054	162.144	249.348
(487) Venetia	1919 June 28	Asteroid	221.850	154.218
		Camb. U. S. 5781	202.495	207.218
		Camb. U. S. 5785	230.943	155.936
		Camb. U. S. 5787	251.133	80.396
		Camb. U. S. 5788	263.430	114.204
	29	Asteroid	143.905	164.733
		Camb. U. S. 5774	65.944	198.698
		Camb. U. S. 5781	141.980	221.736
		Camb. U. S. 5785	170.703	170.594
(489) Comacina	1917 Apr. 13	Asteroid	151.154	255.209
		Albany 4743	135.552	242.452
		Albany 4745	154.468	275.257
		Albany 4746	156.155	278.153
	May 11	Asteroid	88.828	121.893
		Leipzig II 6352	58.120	143.242
		Leipzig II 6357	81.041	155.551
		Albany 4674	82.363	89.513
	1923 May 22	Asteroid	139.370	202.650
		Nicolajew 3985	98.963	231.402
		Nicolajew 3991	124.277	245.686
		Nicolajew 3996	148.144	262.117
		Nicolajew 3997	172.664	154.649
		Nicolajew 4000	187.691	182.445
		Nicolajew 4001	189.824	171.876
	23	Asteroid	176.138	177.530
		Nicolajew 3985	152.400	200.952
		Nicolajew 3986	166.101	195.632
		Nicolajew 3988	169.095	160.831
		Nicolajew 3989	171.748	183.603
		Nicolajew 3992	182.651	180.469
		Nicolajew 3997	227.105	125.193
(490) Veritas	1916 Mar. 4	Asteroid	52.047	266.598
		Leipzig I 3582	28.952	307.103
		Leipzig II 4869	40.425	187.851
		Leipzig II 4880	74.663	167.802
(494) Virtus	1915 Mar. 13	Asteroid	235.258	215.585
		Berlin A 4317	205.801	233.469
		Berlin A 4322	222.043	213.046
		Berlin A 4331	262.393	217.746
	17	Asteroid	208.251	184.550
		Berlin A 4301	193.595	189.005
		Berlin A 4313	244.016	141.593
		Berlin A 4317	251.747	184.437
(497) Iva	1913 Jan. 1	Asteroid	214.301	342.835
		Leiden 2818	180.551	321.694
		Leiden 2859	305.094	310.169
(498) Tokio	1915 Nov. 27	Asteroid	257.429	317.698
		Leipzig I 1284	211.534	306.248
		Leipzig I 1287	225.810	299.517
		Leipzig I 1292	259.467	264.596
	30	Asteroid	242.464	337.400
		Leipzig I 1275	222.206	274.191
		Leipzig I 1284	270.689	319.435
		Leipzig I 1287	285.025	312.775
	Dec. 10	Asteroid	92.083	155.851
		Leipzig I 1225	47.447	234.308
		Leipzig I 1229	71.422	87.710
		Leipzig I 1241	125.941	259.890
(503) Evelyn	1915 Nov. 9	Asteroid	288.604	114.070
		Berlin A 903	242.381	174.960
		Leipzig I 1001	285.923	40.867
		Berlin A 916	300.491	123.607

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Name	Date	Catalogue	Measures x	Measures y
(503) Evelyn (Contd.)	1915 Nov. 10	Asteroid	208.548	108.103
		Berlin A 903	185.362	171.754
		Berlin A 904	190.462	192.449
		Berlin A 916	242.364	119.285
(518) Halawe	1915 Oct. 9	Asteroid	266.375	126.340
		Leipzig II 308	256.099	180.276
		Leipzig II 309	255.838	80.858
		Leipzig II 315	297.692	155.991
		Leipzig II 322	309.435	80.916
	12	Asteroid	263.376	156.282
		Leipzig II 298	259.010	171.675
		Leipzig II 300	261.499	134.383
		Leipzig II 306	285.742	130.488
	1923 Oct. 3	Asteroid	151.224	170.353
		Albany 8133	98.977	140.969
		Albany 8136	118.394	214.151
		Albany 8137	127.811	101.819
		Albany 8139	129.449	214.295
		Albany 8143	161.044	93.249
		Albany 8145	189.972	122.012
		Albany 8146	191.068	193.981
	6	Asteroid	162.849	196.324
		Albany 8125	107.725	243.709
		Albany 8128	110.989	152.193
		Albany 8130	138.993	282.002
		Albany 8133	150.330	212.076
		Albany 8137	179.791	173.416
		Albany 8143	213.147	165.403
(519) Sylvania	1917 Nov. 7	Asteroid	146.944	297.334
		Leipzig I 731	170.943	259.542
		Leipzig I 735	136.198	308.093
		Leipzig I 740	115.913	294.747
	8	Asteroid	59.405	166.154
		Leipzig I 730	55.649	151.653
		Leipzig I 731	59.351	202.821
		Leipzig I 735	93.748	153.978
(526) Jena	1920 Feb. 16	Asteroid	185.984	244.431
		Berlin A 3608	133.260	263.169
		Berlin A 3620	169.405	212.605
		Berlin A 3635	223.853	252.172
	17	Asteroid	225.336	257.432
		Berlin A 3608	188.875	269.752
		Berlin A 3620	225.009	219.184
		Berlin A 3628	270.271	270.046
(530) Turandot	1915 Mar. 14	Asteroid	206.968	192.597
		Leipzig I 4347	191.601	185.142
		Leipzig I 4348	196.130	221.901
		Leipzig I 4355	254.443	166.529
	17	Asteroid	158.491	223.252
		Leipzig I 4330	125.092	240.081
		Leipzig I 4339	161.870	228.460
		Leipzig I 4347	190.431	189.141
(532) Herculina	1916 Dec. 22	Asteroid	51.911	151.753
		Leipzig I 1697	82.551	215.321
		Leipzig I 1699	95.850	158.081
		Leipzig I 1700	101.324	145.697
	28	Asteroid	119.506	51.351
		Leipzig I 1629	85.497	39.307
		Leipzig I 1630	91.086	38.884
		Leipzig I 1636	110.864	67.002
	29	Asteroid	150.456	153.971
		Leipzig I 1629	136.999	133.773
		Leipzig I 1630	142.599	133.357
		Leipzig I 1640	171.898	162.101

Name	Date	Catalogue	Measures x	Measures y
(535) Montague	1922 Nov. 10	Asteroid	164.502	140.554
		Albany 661	122.809	108.130
		Leipzig II 877		
		Leipzig II 884	159.949	171.046
		Leipzig II 885	161.753	170.795
		Leipzig II 888	171.598	149.505
		Leipzig II 889	171.358	129.123
	17	Asteroid	160.316	203.949
		Leipzig II 843	108.601	227.377
		Leipzig II 845	135.344	181.574
		Albany 634		
		Leipzig II 850	157.779	266.300
		Albany 647	173.308	168.290
		Leipzig II 853		
		Leipzig II 859	203.254	237.296
(536) Merapi	1915 Jan. 8	Asteroid	292.387	141.512
		Bonn 7081	271.820	138.526
		Bonn 7087	289.176	156.254
		Bonn 7094	306.766	137.286
	10	Asteroid	283.354	142.445
		Bonn 7078	277.574	165.402
		Bonn 7081	288.109	116.519
		Bonn 7087	305.373	134.271
	Feb. 8	Asteroid	233.188	253.671
		Bonn 6860	219.649	255.448
		Bonn 6878	266.095	252.442
		Bonn 6880	269.937	267.964
	10	Asteroid	249.442	226.466
		Bonn 6835	224.728	219.652
		Bonn 6848	245.058	199.166
		Bonn 6860	266.516	221.166
	17	Asteroid	223.203	134.972
		Bonn 6788	179.225	135.448
		Bonn 6800	206.388	119.139
		Bonn 6808	232.583	133.092
	1916 Apr. 9	Asteroid	284.456	108.319
		Berlin B 4561	261.903	135.865
		Berlin B 4565	283.348	169.444
		Berlin A 4716	282.925	38.938
	10	Asteroid	196.546	116.538
		Berlin B 4561	189.853	143.460
		Berlin A 4716	209.099	46.209
		Berlin B 4565	211.867	176.605
	1917 May 1	Asteroid	252.904	72.851
		Washington 5782	237.256	143.502
		Washington 5788	257.647	141.826
		Washington 5790	263.059	43.851
	11	Asteroid	163.702	194.999
		Washington 5741	119.179	153.804
		Washington 5745	148.867	146.202
		Washington 5753	190.400	194.875
	14	Asteroid	124.449	171.601
		Washington 5733	93.804	157.114
		Washington 5739	132.384	187.545
		Washington 5741	137.020	134.999
	23	Asteroid	72.734	161.879
		Washington 5693	44.163	166.706
		Washington 5700	75.403	145.097
		Washington 5703	97.452	169.634
	25	Asteroid	194.006	219.598
		Washington 5686	168.918	205.648
		Washington 5693	202.930	227.849
		Washington 5700	233.998	205.993
	1919 Sept. 27	Asteroid	122.835	153.022
		Wien-Ottak. 458	69.962	142.224
		Wien-Ottak. 459	71.815	121.843
		Wien-Ottak. 468	148.366	173.802
	29	Asteroid	150.575	197.642
		Wien-Ottak. 453	106.150	203.650
		Wien-Ottak. 458	128.822	193.108
		Wien-Ottak. 468	207.921	224.447

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Name	Date	Catalogue	Measures x	Measures y
(536) Merapi (Contd.)	1919 Oct. 27	Asteroid	227.379	206.949
		Wien-Ottak. 366	204.751	231.749
		Wien-Ottak. 370	241.426	206.351
		Wien-Ottak. 374	265.780	206.512
	1921 Jan. 3	Asteroid	220.526	258.456
		Lund 3133	197.972	203.702
		Lund 3134	197.072	292.272
		Lund 3146	222.768	284.188
		Lund 3148	235.354	213.216
	1922 Feb. 28	Asteroid	168.679	181.252
		Lund 5089	101.701	199.779
		Lund 5107	172.646	175.193
		Leiden 4350 } Lund 5109 }	180.229	187.710
	Mar. 17	Asteroid	145.759	188.724
		Lund 5045	121.889	175.352
		Lund 5050	156.810	291.351
		Lund 5053	172.996	261.899
		Lund 5056	188.763	144.394
	22	Asteroid	243.775	179.209
		Lund 5033	236.701	177.939
		Lund 5035	256.808	168.951
		Lund 5039	276.276	218.953
		Lund 5045	289.664	169.998
	1923 Apr. 20	Asteroid	121.824	179.833
		Albany 4863	102.670	158.800
		Albany 4865	109.250	128.593
		Albany 4869	144.557	219.274
		Albany 4872	149.921	221.776
		Albany 4882	227.477	174.401
	May 19	Asteroid	107.948	204.347
		Albany 4779	50.479	205.088
		Albany 4783	70.175	153.751
		Albany 4785	80.494	162.570
		Albany 4792	161.255	166.327
		Albany 4793	165.871	160.652
		Albany 4794	166.373	169.391
	22	Asteroid	208.492	204.699
		Albany 4776	174.975	178.295
		Albany 4777	176.905	189.250
		Albany 4779	189.903	216.409
		Albany 4783	209.050	164.925
		Albany 4785	219.443	173.638
(538) Friederike	1916 Nov. 1	Asteroid	298.099	308.149
		Leipzig II 1191	230.486	246.279
		Leipzig II 1196	247.152	301.293
		Leipzig II 1203	288.047	336.700
	2	Asteroid	306.797	299.552
		Leipzig II 1191	257.518	244.087
		Leipzig II 1196	274.325	299.055
		Leipzig II 1203	315.265	334.387
(540) Rosamunde	1918 Nov. 27	Asteroid	125.097	193.227
		Leipzig I 1012	102.607	222.474
		Leipzig I 1013	106.435	157.202
		Leipzig I 1014	130.999	155.556
	30	Asteroid	127.074	184.147
		Leipzig I 1003	127.286	149.338
		Leipzig I 1005	139.258	259.345
		Leipzig I 1008	150.445	149.102
	1921 Oct. 5	Asteroid	173.604	151.677
		Leipzig II 355	200.896	104.826
		Leipzig II 364	183.510	154.295
		Leipzig II 368	172.667	165.281
		Leipzig II 378	152.569	90.457
	5	Asteroid	230.756	306.010
		Leipzig II 364	239.546	307.980
		Leipzig II 368	228.596	319.047
		Leipzig II 378	208.160	243.767
		Leipzig II 386	195.465	251.352
(540) Rosamunde (Contd.)	1921 Oct. 6	Asteroid	142.258	205.509
		Leipzig II 350	124.517	171.858
		Leipzig II 353	134.166	226.457
		Leipzig II 357	145.074	155.841
		Leipzig II 364	156.059	217.215
	8	Asteroid	106.450	252.969
		Leipzig II 335	90.491	271.062
		Leipzig II 345	126.901	235.256
		Leipzig II 350	134.171	246.500
(542) Susanna	1916 Jan. 7	Asteroid	63.512	232.497
		Leipzig II 4371	56.419	227.568
		Leipzig II 4384	92.354	218.071
		Leipzig II 4388	104.452	252.865
	8	Asteroid	99.200	178.386
		Leipzig II 4338	49.007	203.081
		Leipzig II 4371	111.184	166.051
		Leipzig II 4372	110.993	156.707
(546) Herodias	1923 Apr. 16	Asteroid	169.650	176.454
		Albany 4447	105.697	166.282
		Albany 4449	133.674	221.056
		Albany 4452	154.883	250.758
		Albany 4455	193.278	180.805
	18	Asteroid	194.875	174.136
		Albany 4445	151.116	235.884
		Albany 4447	171.083	172.699
		Albany 4449	198.774	227.569
		Albany 4455	258.549	187.616
(551) Ortrud	1916 Mar. 11	Asteroid	156.460	214.403
		Leipzig II 5545	126.003	234.222
		Leipzig II 5552	165.756	206.450
		Leipzig II 5554	177.851	235.856
	31	Asteroid	82.997	294.636
		Leipzig I 4029	49.319	307.369
		Leipzig I 4037	77.899	276.452
		Leipzig I 4045	136.848	322.334
(556) Phyllis	1915 Oct. 30	Asteroid	170.746	215.703
		Berlin A 335	142.067	205.104
		Berlin A 342	189.728	188.243
		Berlin A 343	190.398	202.012
	Nov. 3	Asteroid	143.493	169.846
		Berlin A 308	88.851	171.506
		Berlin A 309	90.345	147.256
		Berlin A 335	188.301	202.775
(565) Marbachia	1922 Nov. 24	Asteroid	178.874	167.964
		Leipzig I 1285	148.572	83.437
		Leipzig I 1290	174.197	68.490
		Berlin A 1171	181.287	197.964
		Berlin A 1174	192.518	157.698
		Berlin A 1175	198.217	166.755
	Dec. 12	Asteroid	195.402	157.754
		Leipzig I 1199	167.401	121.946
		Leipzig I 1200	172.474	177.651
		Leipzig I 1201	179.906	185.195
		Leipzig I 1208	206.000	156.952
		Leipzig I 1210	217.667	108.338
(569) Misa	1920 Feb. 16	Asteroid	254.400	175.824
		Berlin A 3638	224.229	203.899
		Berlin A 3644	244.136	111.720
		Berlin A 3647	253.207	225.786
		Berlin A 3664	291.551	150.593
	17	Asteroid	234.127	192.507
		Berlin A 3638	222.419	215.449
		Berlin A 3644	243.040	123.430
		Berlin A 3647	251.201	237.551

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Name	Date	Catalogue	Measures x	Measures y
(572) Rebekka	1916 Sept. 17	Asteroid	171.056	224.329
		Nicolajew 5576	135.555	211.803
		Nicolajew 5578	148.498	204.496
		Nicolajew 5580	181.846	288.857
	19	Asteroid	238.151	186.106
		Nicolajew 5575	216.248	155.005
		Nicolajew 5576	225.513	207.697
		Nicolajew 5578	238.601	200.646
(584) Semiramis	1917 Jan. 30	Asteroid	218.533	200.999
		Leipzig I 3279	209.015	223.030
		Leipzig I 3280	211.059	156.501
		Leipzig I 3293	237.987	161.407
	Feb. 14	Asteroid	213.505	184.950
		Leipzig I 3146	189.820	190.833
		Leipzig I 3147	190.002	175.148
		Leipzig I 3156	226.949	166.547
(595) Polyxena	1914 Oct. 22	Asteroid	270.648	322.373
		Berlin B 832	241.558	304.304
		Berlin B 840	275.173	288.659
(600) Musa	1918 Feb. 11	Asteroid	252.069	258.426
		Leipzig I 3898	243.078	244.577
		Leipzig I 3900	266.452	223.742
		Leipzig I 3905	279.803	268.370
	12	Asteroid	190.881	243.296
		Berlin A 3984	197.654	304.004
		Leipzig I 3898	201.800	216.098
		Berlin A 3986	205.123	308.392
	1922 Jan. 24	Asteroid	117.880	157.330
		Berlin A 2783	86.110	189.314
		Berlin A 2784	88.104	141.282
		Berlin A 2793	115.572	198.302
		Berlin A 2807	149.224	155.057
	25	Asteroid	131.029	162.480
		Berlin A 2783	119.473	185.371
		Berlin A 2784	121.315	137.366
		Berlin A 2792	146.999	86.323
		Berlin A 2793	149.033	194.296
(601) Nerthus	1916 Apr. 10	Asteroid	85.448	209.679
		Leipzig II 6176	60.725	222.147
		Leipzig II 6180	113.606	213.089
		Leipzig II 6187	141.646	225.380
(619) Triberga	1914 Nov. 9	Asteroid	303.676	237.345
		Albany 958	285.675	275.921
		Albany 964	300.834	230.702
(628) Christine	1920 Apr. 24	Asteroid	155.093	258.649
		Leipzig II 6492	78.841	249.198
		Leipzig II 6506	148.993	211.629
		Leipzig II 6509	155.292	193.925
		Leipzig II 6514	185.706	296.602
		Leipzig II 6518	201.244	278.651
	May 14	Asteroid	113.456	216.536
		Leipzig II 6434	78.223	248.652
		Leipzig II 6438	85.658	214.507
		Leipzig II 6441	115.618	209.472
		Leipzig II 6443	126.123	228.228
(631) Philippina	1923 Nov. 9	Asteroid	176.602	162.453
		Berlin A 564	144.874	173.277
		Berlin A 565	145.928	114.402
		Berlin A 566	147.075	173.380
		Berlin A 567	148.924	220.573
		Berlin A 571	172.398	117.201
		Berlin A 573	180.023	165.526
		Berlin A 576	204.331	176.128
(631) Philippina (Con.)	1923 Nov. 10	Asteroid	168.473	151.426
		Berlin A 554	112.578	130.776
		Berlin A 564	153.750	179.896
		Berlin A 565	154.825	121.004
		Berlin A 566	155.949	179.997
		Berlin A 567	157.774	227.197
		Berlin A 571	181.274	123.829
		Berlin A 573	188.898	172.151
(637) Chrysothemis	1921 Oct. 5	Asteroid	205.951	304.100
		Leipzig II 328	207.968	328.277
		Leipzig II 330	204.257	326.702
		Leipzig II 341	151.305	286.680
		Leipzig II 343	148.899	294.873
	6	Asteroid	125.183	60.805
		Leipzig II 304	43.124	58.341
		Leipzig II 307	51.624	40.843
		Leipzig II 328	142.873	42.591
		Leipzig II 330	146.578	44.027
(659) Nestor	1914 Nov. 21	Asteroid	203.434	124.610
		Berlin B 981	199.998	111.099
		Berlin B 984	207.525	135.014
		Berlin B 987	215.132	115.466
(694) Ekard	1922 Nov. 17	Asteroid	104.827	162.852
		Berlin A 615	98.979	214.748
		Berlin A 616	111.328	139.398
		Berlin A 621	139.051	159.813
	21	Asteroid	170.753	192.421
		Leipzig I 640	160.155	142.061
		Berlin A 610	161.521	193.453
		Berlin A 612	180.418	228.774
		Berlin A 614	189.599	187.958
(696) Leonora	1914 Oct. 19	Asteroid	286.736	288.826
		Camb. Eng. 434	254.928	286.496
		Camb. Eng. 443	264.422	324.864
		Camb. Eng. 465	305.077	275.173
(703) Noëmi	1923 Nov. 14	Asteroid	141.409	177.817
		Bord. +17° $3^h 32^m$, 43 [1]	98.874	184.847
		Bord. +17° $3^h 32^m$, 148	114.224	129.293
		Bord. +17° $3^h 32^m$, 64	133.659	200.207
		Bord. +17° $3^h 32^m$, 173	151.625	129.430
		Bord. +17° $3^h 32^m$, 72	153.465	195.354
		Bord. +17° $3^h 32^m$, 85	176.948	172.023
		Bord. +17° $3^h 32^m$, 91	187.369	163.340
(709) Fringilla	1914 Oct. 27	Asteroid	124.900	193.460
		Bonn 2621	98.211	206.417
		Bonn 2624	115.476	239.214
		Bonn 2658	153.449	175.696
	Nov. 6	Asteroid	256.950	208.512
		Bonn 2503	241.894	218.218
		Bonn 2518	264.886	190.201
		Bonn 2520	266.946	219.606
(712) Boliviana	1914 Nov. 17	Asteroid	274.343	37.562
		Berlin A 888	223.077	35.463
		Berlin A902	282.521	56.191
(714) Ulula	1916 Aug. 2	Asteroid	165.354	197.438
		Leipzig II 10325	139.233	237.201
		Albany 7258	152.408	161.553
		Albany 7267	187.852	180.242

[1] Astrographic Catalogue.

[The Astronomische Gesellschaft Catalogue positions used for the comparison stars unless otherwise indicated]

Name	Date	Catalogue	Measures x	Measures y
(723) Hammonia	1916 Oct. 17	Asteroid	297.325	117.224
		Albany 395	269.999	151.099
		Albany 401	304.188	153.001
		Albany 403	305.944	96.479
	22	Asteroid	297.206	135.282
		Albany 369	268.502	124.624
		Albany 374	279.004	150.868
		Albany 381	301.952	105.231
(727) Nipponia	1916 Jan. 7	Asteroid	25.623	114.678
		Leipzig I 2973	22.526	116.861
		Leipzig I 2986	46.828	121.075
		Leipzig I 2988	51.036	127.266
	8	Asteroid	72.751	171.473
		Leipzig I 2962	49.900	126.364
		Leipzig I 2966	65.610	224.344
		Leipzig I 2973	91.948	159.861
(729) Watsonia	1922 June 21	Asteroid	99.293	209.897
		Nicolajew 4178	159.404	231.857
		Nicolajew 4179	148.746	187.707
		Nicolajew 4183	123.500	273.180
		Nicolajew 4186	78.048	207.500
	23	Asteroid	269.731	136.847
		Nicolajew 4177	240.981	172.906
		Nicolajew 4178	243.905	137.360
		Nicolajew 4179	254.328	181.524
		Nicolajew 4183	279.987	96.252
(731) Sorga	1914 Oct. 19	Asteroid	86.828	137.236
		Leipzig II 840	73.968	108.612
		Leipzig II 863	190.101	167.310
	21	Asteroid	63.784	118.984
		Leipzig II 834	53.239	166.371
		Leipzig II 840	94.574	92.278
(733) Mocia	1915 Feb. 21	Asteroid	165.932	290.803
		Berlin B 3905	103.988	335.979
		Berlin B 3916	155.569	264.777
		Berlin B 3927	209.005	292.638
	Mar. 9	Asteroid	154.001	267.258
		Berlin B 3853	148.990	236.160
		Berlin B 3857	174.309	333.687
		Berlin B 3860	194.106	271.574
(734) Benda	1923 Oct. 9	Asteroid	176.399	209.428
		Leipzig II 276	129.326	228.399
		Leipzig II 280	137.505	195.718
		Leipzig II 289	151.431	175.748
		Leipzig II 293	171.223	202.048
		Leipzig II 297	190.223	153.005
		Leipzig II 298	191.441	253.391
		Leipzig II 300	193.601	216.080
		Leipzig II 306	217.727	211.899
	17	Asteroid	182.528	170.043
		Leipzig II 242	153.698	153.470
		Leipzig II 243	154.911	175.778
		Leipzig II 249	178.970	165.894
		Leipzig II 251	180.896	175.675
		Leipzig II 252	184.931	199.852
		Leipzig II 254	190.728	224.346
		Leipzig II 262	220.585	160.502
(738) Alagasta	1922 Nov. 21	Asteroid	220.626	161.448
		Leipzig I 1049	182.402	93.130
		Leipzig I 1054	198.027	167.502
		Leipzig I 1060	242.997	100.605
		Leipzig I 1067	270.207	150.090
(738) Alagasta (Con.)	1922 Nov. 23	Asteroid	268.797	120.445
		Leipzig I 1047	245.576	115.574
		Leipzig I 1048	269.074	142.741
		Leipzig I 1049	269.996	61.051
		Leipzig I 1054	286.053	134.881
(742) [1913 Q U]	1916 Oct. 24	Asteroid	179.758	215.473
		Leipzig II 951	123.002	183.994
		Leipzig II 955	152.503	240.676
		Leipzig II 963	184.798	255.027
	26	Asteroid	148.097	213.202
		Leipzig II 944	115.878	245.791
		Leipzig II 951	134.984	184.602
		Leipzig II 955	164.741	241.154
(743) [1913 Q V]	1922 Jan. 30	Asteroid	58.993	121.550
		Leipzig I 3273	48.442	91.354
		Leipzig I 3274	47.093	129.614
		Leipzig I 3280	38.125	110.600
	31	Asteroid	54.933	161.324
		Leipzig I 3248	101.992	139.618
		Leipzig I 3271	40.237	187.388
		Leipzig I 3273	24.015	135.602
(752) Sulamitis	1917 May 1	Asteroid	108.949	272.778
		Camb. U. S. 5468	60.241	278.986
		Camb. U. S. 5476	105.053	319.074
		Camb. U. S. 5479	120.553	273.269
(754) Malabar	1921 July 27	Asteroid	128.038	188.999
		Leipzig II 9934	76.942	186.414
		Leipzig I 7815	92.464	221.387
		Leipzig II 9967	145.001	156.651
		Leipzig II 9978	162.438	177.743
	Aug. 4	Asteroid	156.323	191.347
		Leipzig II 9870	121.582	188.010
		Leipzig II 9872	129.089	200.439
		Leipzig II 9882	146.443	135.223
		Leipzig II 9906	189.202	175.378
(762) Pulcova	1914 Dec. 21	Asteroid	271.473	177.485
		Lund 2069	229.444	170.942
		Lund 2097	280.647	197.426
(764) [1913 S U]	1915 Jan. 15	Asteroid	183.013	169.490
		Leipzig I 2744	168.187	145.909
		Berlin A 2660	172.363	216.138
		Leipzig I 2760	211.201	136.096
(766) [1913 S W]	1915 Feb. 10	Asteroid	95.261	226.422
		Leiden 3531	82.795	212.766
		Leiden 3537	106.743	294.141
	10	Asteroid	89.104	225.756
		Leiden 3526	62.126	258.858
		Leiden 3528	72.285	165.472
	17	Asteroid	283.330	164.446
		Leiden 3487	263.163	225.009
		Leiden 3494	280.334	153.654
		Leiden 3496	295.775	184.406
(769) Tatiana	1914 Dec. 22	Asteroid	123.289	177.946
		Camb. Eng. 2338	101.886	205.479
		Camb. Eng. 2349	126.085	149.856

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Name	Date	Catalogue	Measures x	Measures y
(769) Tatiana (Contd.)	1915 Jan. 5	Asteroid	138.774	96.997
		Camb. Eng. 2258	125.843	85.350
		Camb. Eng. 2260	132.500	135.739
	9	Asteroid	105.832	63.274
		Camb. Eng. 2245	117.536	82.631
		Camb. Eng. 2254	133.002	44.350
(773) [1913 T V]	1915 Feb. 18	Asteroid	149.641	227.030
		Leipzig II 5359	140.088	179.369
		Leipzig II 5361	146.835	239.030
		Leipzig II 5373	187.300	187.223
	19	Asteroid	204.218	169.108
		Leipzig II 5356	191.926	189.288
		Leipzig II 5359	217.748	120.289
		Leipzig II 5361	224.401	179.868
	Mar. 9	Asteroid	265.049	190.005
		Leipzig II 5252	234.154	232.226
		Leipzig II 5259	259.961	227.210
		Leipzig II 5260	258.818	161.940
(779) Nina	1915 Mar. 21	Asteroid	228.595	167.875
		B. P. G. C. 3293 [1]	194.913	190.013
		A. G. C. 17236 [2]	239.976	211.778
	23	Asteroid	247.743	212.465
		B. P. G. C. 3293 [1]	252.827	227.463
		A. G. C. 17236 [2]	297.951	249.098
(785) Zwetana	1916 Nov. 3	Asteroid	200.055	167.483
		Leipzig II 1017	153.819	148.548
		Leipzig II 1041	211.544	172.886
		Leipzig II 1043	216.731	242.868
	16	Asteroid	186.694	169.673
		Leipzig II 951	131.996	183.108
		Leipzig II 955	161.504	239.828
		Leipzig II 978	264.459	186.353
(787) Moskva	1915 Sept. 15	Asteroid	235.968	191.198
		Albany 310	207.424	131.388
		Leipzig II 416	237.089	257.165
		Leipzig II 428	287.166	247.158
	16	Asteroid	273.775	255.885
		Albany 302	223.156	188.458
		Albany 310	259.408	214.772
		Leipzig II 416	288.396	340.913
	1919 Sept. 24	Asteroid	69.074	228.594
		Albany 90	103.906	213.104
		Albany 102	64.537	193.953
		Albany 105	33.901	241.927
	25	Asteroid	266.246	106.476
		Albany 86	216.600	87.102
		Albany 90	249.452	143.075
		Albany 99	280.802	64.668
	26	Asteroid	209.395	156.696
		Albany 86	177.654	158.073
		Albany 96	233.093	104.762
		Albany 99	241.943	135.949
	27	Asteroid	171.978	136.717
		Albany 85	128.024	98.582
		Albany 86	158.409	159.349
		Albany 96	213.430	105.578
	28	Asteroid	213.202	130.278
		Albany 85	187.501	112.696
		Albany 86	217.245	173.759
		Albany 99	281.555	151.797
	29	Asteroid	226.251	180.645
		Albany 85	218.247	183.903
		Albany 86	248.370	244.821
		Albany 96	303.600	191.281

Name	Date	Catalogue	Measures x	Measures y
(787) Moskva (Contd.)	1919 Oct. 3	Asteroid	201.055	52.318
		Nicolajew 56	166.546	89.865
		Nicolajew 57	175.653	91.701
		Nicolajew 62	203.302	73.175
		Nicolajew 65	221.699	53.151
	Nov. 14	Asteroid	233.068	132.331
		Straszburg 15	168.922	160.152
		Straszburg 18	175.195	130.222
		Straszburg 34	264.785	108.782
	15	Asteroid	118.621	210.986
		Straszburg 15	50.659	243.536
		Straszburg 18	57.098	213.580
		Straszburg 34	146.903	192.551
	18	Asteroid	185.399	177.422
		Straszburg 18	109.743	192.375
		Wien-Ottak. 20 Straszburg 27	168.481	154.094
		Wien-Ottak. 25 Straszburg 34	199.467	171.393
(792) Metcalfia	1917 Aug. 17	Asteroid	258.347	186.394
		Albany 7713	221.339	208.487
		Nicolajew 5592	261.213	139.631
		Nicolajew 5597	288.831	179.649
	18	Asteroid	208.374	283.967
		Nicolajew 5585	152.346	286.477
		Nicolajew 5592	232.684	241.494
		Nicolajew 5597	260.199	281.604
(797) Montana	1916 Mar. 9	Asteroid	176.702	209.649
		Leipzig II 5040	173.618	203.019
		Leipzig II 5044	182.022	249.561
		Leipzig II 5048	188.036	189.198
	9	Asteroid	139.923	219.145
		Leipzig II 5040	136.650	212.337
		Leipzig II 5044	144.493	258.647
		Leipzig II 5048	151.101	198.777
	1922 Oct. 24	Asteroid	145.804	153.002
		Leipzig I 488	144.445	171.462
		Leipzig I 491	155.301	138.201
		Leipzig I 498	176.210	197.652
		Leipzig I 499	181.743	163.474
	25	Asteroid	133.686	206.726
		Leipzig I 478	110.648	182.994
		Leipzig I 479	112.415	155.704
		Leipzig I 483	129.576	217.442
		Leipzig I 491	162.844	201.900
		Leipzig I 494	171.949	167.548
(860) Ursina	1922 Feb. 28	Asteroid	150.441	196.485
		Leipzig II 5200	95.150	151.155
		Leipzig II 5218	157.958	174.004
		Leipzig II 5221	162.675	256.976
		Leipzig II 5223	168.258	238.238
	Mar. 5	Asteroid	141.815	173.790
		Leipzig II 5187	117.824	175.535
		Leipzig II 5191	133.397	147.608
		Leipzig II 5196	161.363	232.227
		Leipzig II 5197	164.072	109.855
(886) Washingtonia	1917 Nov. 16	Asteroid	212.765	308.850
		Leipzig II 1064	185.600	258.298
		Leipzig II 1068	206.789	274.874
		Leipzig II 1083	250.543	320.195
	17	Asteroid	244.372	290.324
		Leipzig II 1064	239.505	231.728
		Leipzig II 1068	260.703	248.559
		Leipzig II 1083	304.257	294.639
	19	Asteroid	137.392	231.499
		Leipzig II 1044	90.499	192.477
		Leipzig I 834	120.198	300.967
		Leipzig II 1052	138.950	180.990

[1] Boss Preliminary General Cat.

[2] Arglander General Cat.

[The Astronomische Gesellschaft Catalogue positions used for the comparison stars unless otherwise indicated]

Name	Date	Catalogue	Measures x	Measures y
(886) Washingtonia (Contd.).	1917 Dec. 1	Asteroid	205.746	108.798
		Leipzig I 784	201.647	149.659
		Leipzig II 992	220.424	69.036
		Leipzig I 794	246.652	83.297
	5	Asteroid	217.726	95.673
		Leipzig I 763	174.138	68.636
		Leipzig I 766	204.914	136.239
		Leipzig I 784	273.507	99.564
	10	Asteroid	146.234	137.109
		Leipzig I 750	123.681	90.443
		Leipzig I 764	179.856	178.636
		Leipzig I 766	193.236	129.201
	15	Asteroid	192.330	199.531
		Leipzig I 734	136.997	230.029
		Leipzig I 741	164.000	245.902
		Leipzig I 745	189.850	145.303
		Leipzig I 749	211.020	275.073
	1918 Jan. 9	Asteroid	191.178	186.084
		Leipzig I 747	165.394	194.755
		Leipzig I 754	195.101	172.101
		Leipzig I 760	207.942	175.246
	21	Asteroid	191.996	185.977
		Lund 4589	177.522	171.101
		Lund 4590	179.056	263.738
		Lund 4593	188.543	271.239
		Lund 4605	205.830	178.613
	27	Asteroid	202.232	176.651
		Lund 4571	181.425	171.508
		Lund 4574	197.702	213.524
		Lund 4583	206.522	121.748
	31	Asteroid	227.750	167.375
		Lund 4550	195.911	183.871
		Lund 4553	218.151	61.860
		Lund 4557	244.059	197.507
		Lund 4559	249.114	164.103
		Lund 4562	254.698	80.753
	1923 Dec. 8	Asteroid	208.274	239.300
		Leiden 2412	192.230	246.446
		Leiden 2419	205.657	232.200
		Leiden 2420	213.549	280.054
		Leiden 2421	213.548	310.149
		Leiden 2423	215.900	218.877
		Leiden 2425	218.051	299.800
		Leiden 2426	224.999	208.349
	11	Asteroid	183.101	274.479
		Leiden 2373	121.179	266.802
		Leiden 2376	127.504	180.412
		Leiden 2383	163.611	301.005
		Leiden 2390	181.203	301.829
		Leiden 2402	207.575	230.677
		Leiden 2405	215.400	183.153
		Leiden 2412	232.725	256.899
(906) Repsolda	1923 Nov. 10	Asteroid	118.236	63.238
		Berlin A 778	195.004	91.100
		Berlin A 786	148.807	40.149
		Berlin A 787	147.969	119.677
		Berlin A 790	115.738	158.429
		Berlin A 796	90.136	31.637
		Berlin A 799	80.897	119.270
	13	Asteroid	242.404	244.530
		Berlin A 772	199.553	226.390
		Berlin A 773	200.666	266.403
		Berlin A 774	201.500	295.948
		Berlin A 778	233.050	218.300
		Berlin A 786	279.124	269.303
		Berlin A 787	280.121	189.779
(915) Cosetta	1921 Oct. 5	Asteroid	67.569	115.455
		Leipzig II 399	80.035	102.372
		Leipzig II 400	75.159	113.374
		Leipzig II 402	73.103	119.745
		Leipzig II 404	68.811	85.102

Name	Date	Catalogue	Measures x	Measures y
(915) Cosetta (Contd.)	1921 Oct. 5	Asteroid	124.109	269.391
		Leipzig II 399	135.250	256.072
		Leipzig II 402	128.319	273.582
		Leipzig II 412	68.903	273.547
		Leipzig II 413	63.938	242.617
	6	Asteroid	246.335	252.533
		Leipzig II 393	230.288	210.247
		Leipzig II 394	235.828	254.526
		Leipzig II 399	260.649	267.997
		Leipzig II 405	271.417	210.370
	8	Asteroid	204.416	322.505
		Leipzig II 364	165.935	291.749
		Leipzig II 368	176.701	280.661
		Leipzig II 392	234.748	286.946
		Leipzig II 393	239.830	284.889
(925) Alphonsina	1920 Jan. 28	Asteroid	230.254	160.327
		Berlin B 3144	188.686	137.825
		Berlin B 3154	218.327	209.632
		Berlin B 3155	221.099	219.789
		Berlin B 3160	236.005	100.962
		Berlin B 3161	237.772	114.568
	Feb. 25	Asteroid	154.212	145.684
		Berlin A 2855	134.101	157.146
		Berlin A 2859	143.381	153.444
		Berlin A 2864	149.725	116.130
		Berlin A 2885	210.229	163.777
	Mar. 17	Asteroid	194.770	227.117
		Berlin A 2844	157.468	228.299
		Berlin A 2850	174.299	215.568
		Berlin A 2852	179.463	259.942
		Berlin A 2857	196.875	252.769
		Berlin A 2874	241.950	215.447
	Sept. 12	Asteroid	125.854	234.956
		Albany 7468	106.521	241.708
		Albany 7469	113.924	232.698
		Albany 7470	125.687	271.110
		Nicolajew 5427	138.066	158.598
	13	Asteroid	111.629	174.597
		Albany 7461 } Nicolajew 5418 }	77.398	124.481
		Albany 7466	96.197	165.981
		Albany 7468	108.221	183.520
		Albany 7469	115.674	174.496
(945) Barcelona	1921 Feb. 12	Asteroid	166.238	197.776
		Bord. +17° $9^{h}\,0^{m}$, 55 [1]	156.985	184.041
		Bord. +17° $9^{h}\,0^{m}$, 61	165.638	193.146
		Bord. +17° $9^{h}\,0^{m}$, 68	168.661	198.680
		Bord. +17° $9^{h}\,0^{m}$, 69	173.392	191.352
		Bord. +17° $9^{h}\,0^{m}$, 70	174.135	189.682
		Bord. +17° $9^{h}\,0^{m}$, 74	179.566	201.439
	14	Asteroid	185.542	165.323
		Bord. +17° $9^{h}\,0^{m}$, 11 [1]	175.138	187.418
		Bord. +17° $9^{h}\,0^{m}$, 12	179.228	164.575
		Bord. +17° $9^{h}\,0^{m}$, 18	188.454	160.676
		Bord. +17° $9^{h}\,0^{m}$, 19	190.415	162.799
		Bord. +17° $9^{h}\,0^{m}$, 141	182.362	146.924
		Bord. +17° $9^{h}\,0^{m}$, 153	204.476	147.587
	Mar. 1	Asteroid	171.682	138.233
		Bord. +14° $8^{h}\,40^{m}$, 21 [1]	184.838	149.936
		Bord. +14° $8^{h}\,40^{m}$, 118	162.454	127.771
		Bord. +14° $8^{h}\,40^{m}$, 119	164.524	142.788
		Bord. +14° $8^{h}\,40^{m}$, 124	168.768	137.479
		Bord. +14° $8^{h}\,40^{m}$, 132	186.245	138.223
	11	Asteroid	224.366	57.707
		Leipzig I 3432	158.259	81.182
		Leipzig I 3433	158.976	60.247
		Leipzig I 3440	188.458	40.012
		Leipzig I 3456	254.179	85.830
		Leipzig I 3471	283.363	68.749
		Leipzig I 3473	285.610	47.860
(980) Anacostia	Nov. 21	Asteroid	61.207	233.557
		Leipzig II 11191	24.406	239.338
		Leipzig II 11207	82.744	280.802
		Leipzig II 11208	87.193	225.347
		Leipzig II 11209	91.915	270.041
	25	Asteroid	51.561	251.913
		Leipzig II 11234	47.613	255.513
		Leipzig II 11240	60.844	241.311
		Leipzig II 11242	63.139	240.398

[1] Astrographic Catalogue.

[The Astronomische Gesellschaft Catalogue positions used for the comparison stars unless otherwise indicated]

Name	Date	Catalogue	Measures x	Measures y
(980) Anacostia (Con.)	1921 Nov. 29	Asteroid	281.061	228.447
		Leipzig II 11266	250.892	199.022
		Leipzig II 11270	265.185	248.011
		Leipzig II 11274	284.487	263.631
		Leipzig II 11276	294.750	259.496
	Dec. 1	Asteroid	180.450	164.775
		Leipzig II 11284	170.199	187.344
		Leipzig II 11286	171.706	179.818
		Leipzig II 11288	195.193	157.571
		Leipzig II 11292	205.779	127.726
	3	Asteroid	109.571	185.102
		Leipzig II 11288	59.101	172.153
		Leipzig II 11292	68.701	141.961
		Leipzig I 8993	88.684	231.623
		Leipzig II 11306	113.574	196.647
	9	Asteroid	127.520	151.038
		Leipzig II 11357	112.293	145.752
		Leipzig II 11362	142.397	146.401
		Leipzig I 9070	165.698	181.520
	22	Asteroid	204.249	156.178
		Leipzig I 9173	178.373	128.596
		Leipzig I 9183	202.473	214.192
		Leipzig I 9188	225.352	148.458
		Leipzig I 9193	252.496	148.099
	27	Asteroid	205.660	181.598
		Leipzig I 9215	162.222	179.204
		Leipzig I 9226	204.909	194.731
		Leipzig I 9228	219.450	171.201
		Leipzig I 9231	225.653	167.656
	1922 Jan. 2	Asteroid	85.709	196.132
		Leipzig I 9274	60.894	168.989
		Leipzig I 9279	80.220	117.800
		Leipzig I 9280	87.616	206.253
		Leipzig I 9282	106.006	210.753
	7	Asteroid	144.559	206.151
		Leipzig I 9314	122.139	225.448
		Leipzig I 9317	145.705	256.593
		Leipzig I 9326	171.099	145.375
		Leipzig I 9327	171.306	191.381
	14	Asteroid	131.168	237.799
		Leipzig I 9374	49.501	223.039
		Leipzig I 9398	134.698	267.937
		Leipzig I 9399	137.685	291.642
		Leipzig I 9400	140.829	263.624
		Leipzig I 9408	185.955	200.952
	24	Asteroid	235.400	180.523
		Leipzig I 9490	175.110	177.706
		Leipzig I 9502	215.646	238.051
		Leipzig I 9505	219.205	148.050
		Leipzig I 9522	283.457	194.700
	25	Asteroid	151.498	214.123
		Leipzig I 9505	90.859	171.002
		Leipzig I 9514	122.424	134.909
		Leipzig I 9517	138.000	289.478
		Leipzig I 9522	155.715	216.809
		Leipzig I 9524	176.496	176.877
		Leipzig I 9525	185.501	263.436
		Leipzig I 9529	197.271	224.822
		Leipzig I 9530	199.302	244.327
	Sept. 26	Asteroid	208.462	139.660
		Camb. Eng. 4175	177.008	191.016
		Berlin B 3131 Camb. Eng. 4189	206.305	130.092
		Camb. Eng. 4191	210.499	188.481
		Berlin B 3135	212.351	108.847
		Camb. Eng. 4204 Berlin B 3137	228.375	134.018
		Camb. Eng. 4206	242.219	190.249
	Oct. 30	Asteroid	252.123	193.882
		Berlin B 3331	239.891	185.849
		Berlin B 3334	247.120	155.698
		Berlin B 3335	251.302	163.147
		Berlin B 3341	265.952	229.652
	1923 Jan. 9	Asteroid	198.374	181.723
		Berlin A 3072	173.521	183.506
		Berlin A 3075	178.049	172.555
		Berlin A 3081	181.856	192.228
		Berlin A 3091	210.279	186.332
		Berlin A 3095	215.226	209.251
		Berlin A 3097	217.420	138.822

Name	Date	Catalogue	Measures x	Measures y
(980) Anacostia (Con.)	1923 Jan. 13	Asteroid	179.802	198.754
		Berlin A 3027	120.603	166.770
		Berlin A 3030	123.506	229.450
		Berlin A 3035	130.719	119.404
		Berlin A 3053	191.072	191.331
		Berlin A 3055	194.101	191.250
		Berlin A 3061	207.050	201.829
		Berlin A 3062	207.902	224.824
	Apr. 16	Asteroid	156.924	181.388
		Berlin A 2811	97.520	163.519
		Berlin A 2824	134.807	216.460
		Berlin A 2844	177.890	210.885
		Leipzig I 2922 Berlin A 2848	183.807	115.690
		Berlin A 2850	194.695	198.188
	1924 Mar. 31	Asteroid	181.696	101.348
		Alger 5034 [1]	159.666	73.932
		Alger 5038	182.202	138.801
		Alger 5041	182.485	53.076
		Alger 5046	194.435	94.185
		Alger 5047	199.640	108.620
	Apr. 8	Asteroid	175.924	221.132
		Alger 4991 [1]	142.123	245.458
		Alger 4995	156.042	253.120
		Alger 5000	171.243	178.477
		Alger 5011	208.048	243.127
		Alger 5022	235.944	185.744
(1028) [1923 P G]	1923 Nov. 13	Asteroid	206.514	203.761
		Berlin A 1025	157.274	204.987
		Berlin A 1031	178.693	193.457
		Berlin A 1038	208.651	253.145
		Berlin A 1044	222.800	229.504
		Berlin A 1045	225.887	250.134
		Berlin A 1048	235.297	157.472
	14	Asteroid	262.161	208.199
		Berlin A 1025	231.960	209.049
		Berlin A 1026	235.218	285.035
		Berlin A 1027	237.899	254.090
		Berlin A 1031	253.595	197.852
		Berlin A 1038	282.684	258.001
		Berlin A 1041	292.720	134.123
		Berlin A 1042	296.548	159.803
	Dec. 1	Asteroid	225.902	165.406
		Berlin A 974	204.605	196.742
		Bord. +17° 3h 32m, 59 [2]	205.303	170.747
		Bord. +17° 3h 32m, 64	215.677	143.956
		Bord. +17° 3h 32m, 71	235.049	188.691
		Bord. +17° 3h 32m, 75	237.634	157.746
		Bord. +17° 3h 32m, 81	245.492	147.618
[1915 Y J]	1915 Feb. 18	Asteroid	50.265	258.178
		Leipzig II 5328	20.121	283.558
		Leipzig II 5336	50.845	255.367
		Leipzig II 5347	92.951	262.663
	19	Asteroid	102.179	200.136
		Leipzig II 5320	54.412	171.123
		Leipzig II 5328	92.800	220.366
		Leipzig II 5336	123.863	192.644
	Mar. 9	Asteroid	204.274	279.837
		Leipzig II 5236	172.595	204.361
		Leipzig II 5252	234.154	232.226
		Leipzig I 3871	234.980	334.110
Asteroid	1915 Sept. 10	Asteroid	200.803	273.370
		Leipzig II 11759	173.200	291.502
		Leipzig II 11771	236.316	267.789
		Leipzig II 11778	247.101	285.304
	12	Asteroid	106.500	269.543
		Leipzig II 11746	81.401	222.319
		Leipzig II 11753	101.070	313.920
		Leipzig II 11759	122.041	286.850
[1916 B A]	1916 Apr. 10	Asteroid	241.848	70.887
		Nicolajew 3537	148.257	69.327
		Nicolajew 3553	260.703	105.855
		Nicolajew 3552	262.641	65.044

[1] Alger Catalogue (1900).

[2] Astrographic Catalogue.

RESULTS OF OBSERVATIONS OF ASTEROIDS

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(3) JUNO						
		(1925.0)		O. M. No. 654		
1922	h m	h m s	° ′ ″	m	′	
Sept. 26	20 44. 0	3 31 32. 38	+ 4 50 59. 9	+0. 2	− 5	Alb., A. G. 1021, 1038, 1040; Leip. II, A. G. 1317, ½ (Alb., A. G. 1027+Leip. II, A. G. 1315), ½ (Alb., A. G. 1033+Leip. II, A. G. 1326).
27	18 55. 0	3 31 54. 83	+ 4 40 57. 3	+0. 2	− 5	Alb., A. G. 1036, 1038, 1040, ½ (Alb., A. G. 1027+Leip. II, A. G. 1315), ½ (Alb., A. G. 1033+Leip. II, A. G. 1326).
(5) ASTRAEA						
1915		(1915.0)		B. J. 1917		
Nov. 3	15 37. 0	1 43 0. 80	+ 2 11 14. 0	+3. 7	+18	Alb., A. G. 503, 507, 510.
5	15 59. 0	1 41 19. 34	+ 2 2 0. 8	+3. 7	+18	Alb., A. G. 494, 498, 503.
(10) HYGIEA						
1923		(1925.0)		O. E. 1923		
Sept. 10	15 7. 0	22 29 23. 44	− 4 38 20. 2	+0. 1	0	Strasz., A. G. 7826, 7828, 7830, 7831, 7834, 7842.
17	15 56. 0	22 24 38. 06	− 5 5 56. 6	+0. 1	− 1	Strasz., A. G. 7810, 7812, 7813, 7817, 7818.
(12) VICTORIA						
1916		(1916.0)		B. J. 1918		
Jan. 2	15 9. 0	6 41 13. 31	+13 55 32. 6	−0. 4	− 1	Leip. I, A. G. 2463, 2468, 2476.
7	14 16. 6	6 35 51. 85	+13 54 6. 1	−0. 4	− 1	Leip. I, A. G. 2401, 2406, 2424.
(16) PSYCHE						
1919		(1925.0)		O. E. 1919		
July 25	16 25. 4	20 36 20. 19	−16 27 5. 3	+1. 9	+ 5	Wash., A. G. 7774, 7782, 7789.
(17) THETIS						
1916		(1916.0)		B. J. 1918		
Dec. 2	17 2. 0	4 38 8. 84	+14 58 7. 2	−1. 2	− 2	Leip. I, A. G. 1356, 1368, Ber. A, A. G. 1275.
22	14 40. 0	4 19 11. 82	+14 51 0. 6	−1. 0	− 2	Leip. I, A. G. 1277, 1278, 1285.
(18) MELPOMENE						
1917		(1917.0)		O. E. 1917		
Mar. 22	16 37. 9	11 12 32. 30	+11 10 53. 2	−0. 1	+ 1	Leip. I, A. G. 4237, 4239, 4257.
24	15 24. 8	11 10 56. 29	+11 25 27. 3	−0. 1	+ 1	Leip. I, A. G. 4233, 4237, 4239.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(24) THEMIS						
		(1917.0)		O. E. 1917		
1917	h m	h m s	° ′ ″	m	′	
Oct. 11	15 29. 8	1 6 21. 98	+ 6 40 51. 9	−2. 1	−13	Leip. II, A. G. 409, 415, 429.
14	15 53. 7	1 4 5. 51	+ 6 27 29. 3	−2. 1	−13	Leip. II, A. G. 403, 409, 415.
(25) PHOCAEA						
1917		(1917.0)		O. E. 1917		
Nov. 16	16 17. 3	2 37 54. 36	+ 7 30 19. 6	−5. 2	− 9	Leip. II, A. G. 991, 994, 997.
17	15 5. 6	2 37 7. 18	+ 7 18 37. 0	−5. 2	− 9	Leip. II, A. G. 988, 991, 994.
(26) PROSERPINA						
1915		(1915.0)		B. J. 1917		
Oct. 25	13 48. 0	1 2 46. 90	+ 4 15 14. 2	0. 0	0	Alb., A. G. 298, 299, 301.
27	16 20. 0	1 1 6. 76	+ 4 7 56. 2	−0. 1	0	Alb., A. G. 279, 294, 301.
1922		(1925.0)		O. E. 1922		
Mar. 25	15 55. 0	12 2 21. 58	+ 4 18 31. 5	−1. 2	+ 6	Alb., A. G. 4418, 4421, 4423, 4433.
(29) AMPHITRITE						
1917		(1917.0)		O. E. 1917		
Oct. 16	16 24. 8	1 41 24. 21	+16 9 50. 8	−0. 4	− 2	Ber. A, A. G. 494, 498, 513.
17	15 54. 9	1 40 25. 86	+16 7 22. 4	−0. 4	− 2	Ber. A, A. G. 481, 487, 498.
1921		(1925.0)		O. E. 1921		
Oct. 5	16 59. 5	1 1 41. 30	+10 17 55. 5	−4. 9	−37	Leip. II, A. G. 372, 376; Leip. I, A. G. 306, 308.
8	15 52. 0	0 58 50. 27	+10 9 43. 9	−5. 0	−38	Leip. II, A. G. 347, 376; Leip. I, A. G. 265, 272.
1923		(1925.0)		O. E. 1923		
Mar. 14	14 54. 0	9 59 21. 78	+15 45 59. 5	+0. 1	0	Ber. A, A. G. 4013, 4021, 4022, 4028, 4032.
17	14 3. 0	9 57 16. 10	+15 47 44. 4	+0. 1	0	Ber. A, A. G. 3995, 4001, 4004, 4008, 4013, 4021.
(30) URANIA						
1918		(1918.0)		O. E. 1918		
Feb. 11	16 19. 4	9 53 31. 43	+11 43 29. 4	−5. 3	+30	Leip. I, A. G. 3901, 3912, 3915.
1919		(1925.0)		O. E. 1919		
June 16	15 17. 0	16 15 47. 08	−24 6 21. 9	−4. 2	+11	Cord. Zone Cat. A (1900), 11418, 11430, 11433, 11437, 11451, 11453.
21	14 47. 0	16 11 23. 10	−23 50 47. 7	−4. 1	+11	Cord. Zone Cat. A (1900), 11389, 11396, 11400, 11416, 11418.

1757—29——26

(32) POMONA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1912.0)		B. J. 1914		
1912	h m	h m s	° ′ ″	m	′	
Oct. 1	15 11. 5	0 52 35. 24	+ 9 53 27. 6	+5. 1	+11	Leip. II, A. G. 317, 318.
4	15 12. 5	0 50 5. 48	+ 9 33 3. 8	+5. 1	+11	Leip. II, A. G. 302, 318.
5	15 3. 0	0 49 15. 22	+ 9 26 9. 9	+5. 2	+11	Leip. II, A. G. 302, 318.
7	14 53. 0	0 47 35. 34	+ 9 12 17. 7	+5. 2	+11	Leip. II, A. G. 278, 282, 302.
1916		(1916.0)		B. J. 1918		
Sept. 23	16 11. 6	23 49 58. 31	+ 5 0 30. 8	−0. 2	− 1	Alb., A. G. 8186, 8190, 8194.
25	15 29. 0	23 48 22. 15	+ 4 46 41. 4	−0. 2	− 1	Alb., A. G. 8177, 8178, 8186.
1918		(1918.0)		O. E. 1917		
Jan. 19	14 51. 1	6 6 11. 84	+15 59 59. 9	−0. 4	+ 1	Ber. A., A. G. 1954, 1966, 1967.

(33) POLYHYMNIA

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1922		(1925.0)		O. E. 1922		
Nov. 17	14 36. 5	2 13 56. 60	+15 34 3. 1	−0. 5	− 3	Ber. A, A. G. 630, 644, Leip. I, A. G. 675, ½ (Ber. A, A. G. 631+Leip. I, A. G. 667).
21	14 19. 0	2 11 29. 85	+15 23 10. 5	−0. 4	− 3	Ber. A, A. G. 619, 630, Leip. I, A. G. 663, ½ (Ber. A, A. G. 631+Leip. I, A. G. 667).

(34) CIRCE

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Jan. 7	16 26. 1	7 36 15. 09	+12 46 41. 0	−4. 2	+ 9	Leip. I, A. G. 3030, 3034, 3052.
8	16 1. 0	7 35 20. 55	+12 48 59. 6	−4. 2	+ 9	Leip. I, A. G. 3028, 3030, 3034.

(37) FIDES

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1917		(1917.0)		O. E. 1917		
Feb. 17	15 46. 5	9 50 8. 58	+16 46 22. 8	−0. 7	+ 4	Ber. A, A. G. 3966, 3975, 3977.
20	15 3. 3	9 47 18. 41	+16 56 43. 2	−0. 7	+ 4	Ber. A, A. G. 3950, 3958, 3961.

(38) LEDA

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1922		(1925.0)		O. E. 1922		
Sept. 16	15 24. 0	22 54 59. 65	+ 2 16 32. 4	+0. 3	+ 3	Alb., A. G. 7918, 7925, 7927, 7936, 7938.
19	14 34. 0	22 52 32. 12	+ 2 3 42. 6	+0. 3	+ 3	Alb., A. G. 7897, 7913, 7918, 7925.

(39) LAETITIA

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Mar. 31	15 20. 0	11 25 54. 47	+ 8 54 4. 4	+3. 4	− 6	Leip. II, A. G. 5818, 5830, 5831.
Apr. 10	13 29. 2	11 20 12. 03	+ 9 47 40. 6	+3. 4	− 5	Leip. I, A. G. 4291, Leip. II, A. G. 5786, 5804.

(41) DAPHNE

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1916.0)		B. J. 1918		
1916	h m	h m s	° ′ ″	m	′	
Apr. 10	16 4. 0	12 45 41. 55	+ 4 23 37. 8	+5. 0	+ 8	Alb., A. G. 4580, 4581, ½ (Alb., A. G. 4576+4577).
		(1925.0)		O. E. 1921		
1921 July 2	15 55. 0	18 34 57. 19	+ 4 35 30. 1	−3. 9	−12	Alb., A. G. 6293, 6301, 6302, 6309.
25	14 29. 5	18 19 53. 91	+ 1 52 20. 9	−3. 9	−11	Alb., A. G. 6208, 6213, 6214, 6226.

(49) PALES

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1917.0)		O. E. 1917		
1917 Oct. 13	15 49. 1	0 38 45. 57	+10 2 34. 4	+1. 8	+14	Leip. I, A. G. 178, Leip. II, A. G. 236, 240.

(50) VIRGINIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1925.0)		O. E. 1922		
1922 Dec. 19	14 31. 0	4 58 54. 47	+17 40 18. 8	−0. 6	− 2	Ber. A, A. G. 1370, 1381, 1384, 1385.
22	15 13. 0	4 56 13. 04	+17 39 8. 7	−0. 6	− 1	Ber. A, A. G. 1358, 1362, 1370, 1384.

(51) NEMAUSA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1916.0)		B. J. 1918		
1916 Mar. 4	15 35. 8	8 52 38. 26	+ 8 54 27. 3	−6. 2	+20	Leip. II, A. G. 4880, 4890, 4896.

(52) EUROPA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1925.0)		O. E. 1923		
1923 Jan. 9	15 33. 0	7 53 16. 64	+17 45 52. 6	−0. 6	+ 1	Ber. A, A. G. 3109, 3121, 3126, 3130.
13	14 32. 0	7 49 56. 43	+18 4 43. 8	−0. 6	+ 1	Ber. A, A. G. 3072, 3081, 3092, 3095.

(57) MNEMOSYNE

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1915.0)		B. J. 1917		
1915 Oct. 9	15 54. 0	0 30 26. 52	+ 6 56 36. 8	+0. 4	− 7	Leip. II, A. G. 171, 180, 185.
10	15 5. 0	0 29 49. 47	+ 6 47 4. 4	+0. 4	− 7	Leip. II, A. G. 157, 166, 171.
11	13 15. 3	0 29 14. 46	+ 6 37 58. 9	+0. 4	− 6	Leip. II, A. G. 157, 162, 166.

(58) CONCORDIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1917.0)		O. E. 1917		
1917 Jan. 16	15 5. 0	6 46 17. 96	+16 35 11. 6	+0. 2	+ 1	Ber. A, A. G. 2431, 2432, 2448.
19	14 0. 5	6 43 45. 20	+16 43 46. 6	+0. 2	+ 1	Ber. A, A. G. 2382, 2388, 2405.
		(1925.0)		O. E. 1922		
1922 Mar. 17	15 41. 0	11 2 53. 17	+ 7 15 21. 4	+0. 3	− 2	Leip. II, A. G. 5683, 5684, 5689, 5697.
22	15 40. 0	10 59 14. 30	+ 7 48 14. 0	+0. 3	− 2	Leip. II, A. G. 5663, 5667, 5670, 5671.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(59) ELPIS						
		(1916.0)		B. J. 1918		
1916	h m	h m s	° ′ ″	m	′	
Mar. 31	14 20. 5	10 27 1. 90	+ 8 51 55. 7	−5. 4	+29	Leip. II, A. G. 5495, 5496, 5508.
(60) ECHO						
1916		(1916.0)		B. J. 1918		
Nov. 27	14 37. 5	3 54 51. 66	+14 48 39. 7	+8. 4	+18	Leip. I, A. G. 1154, 1158, 1171.
Dec. 1	14 37. 5	3 51 1. 24	+14 31 17. 2	+8. 4	+18	Leip. I, A. G. 1132, 1135, 1149.
(61) DANAË						
1922		(1925.0)		O. E. 1922		
Sept. 22	14 44. 5	23 9 5. 22	+ 6 12 56. 3	−0. 3	− 3	Leip. II, A. G. 11557, 11560, 11577, 11578.
23	14 48. 0	23 8 6. 17	+ 6 14 4. 2	−0. 3	− 3	Leip. II, A. G. 11553, 11554, 11557, ½ (Leip. II, A. G. 11544,+Alb., A. G. 7993).
(62) ERATO						
1921		(1925.0)		O. E. 1921		
Nov. 22	15 18. 0	3 1 17. 89	+13 34 53. 4	−3. 4	−15	Leip. I, A. G. 919, 920, 921, 922.
25	14 40. 0	2 59 6. 03	+13 27 47. 5	−3. 3	−14	Leip. I, A. G. 903, 904, 909, 912.
1923		(1925.0)		O. E. 1923		
Mar. 9	14 26. 0	9 47 13. 57	+14 45 9. 4	−6. 6	+32	Ber. A, A. G. 3939, 3946, 3967, Leip. I, A. G. 3881, ½ (Ber. A, A. G. 3959+Leip. I, A. G. 3887).
10	14 44. 0	9 46 35. 82	+14 48 39. 8	−6. 6	+32	Ber. A, A. G. 3939,3942, 3946, Leip. I, A. G. 3881, ½ (Ber. A, A. G. 3959+Leip. I, A. G. 3887).
(64) ANGELINA						
1918		(1918.0)		O. E. 1918		
Mar. 11	15 58. 6	10 56 17. 33	+ 5 22 10. 8	−1. 2	+ 8	Leip. II, A. G. 5653, 5662, 5668.
(65) CYBELE						
1915		(1915.0)		B. J. 1917		
Nov. 10	15 52. 0	3 33 23. 46	+14 30 14. 7	−3. 2	−12	Leip. I, A. G. 1054, 1055, 1057.
26	14 4. 0	3 21 46. 02	+13 46 8. 8	−3. 1	−12	Leip. I, A. G. 997, 1005, 1009.
1918		(1918.0)		O. E. 1918		
Mar. 15	15 51. 9	11 17 13. 70	+ 5 39 24. 6	−0. 8	+ 6	Leip. II, A. G. 5770, 5775, 5779.
17	16 44. 2	11 15 50. 82	+ 5 49 52. 0	−0. 9	+ 6	Leip. II, A. G. 5764, 5770, 5774.

(67) ASIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1915.0)		B. J. 1917		
1915	h m	h m s	° ′ ″	m	′	
Dec. 10	15 56. 5	5 55 49. 38	+15 11 15. 2	2. 9	− 2	Ber. A, A. G. 1811, 1835, 1857.
1916		(1916.0)				
Jan. 2	13 19. 8	5 32 22. 22	+14 51 32. 4	2. 7	2	Leip. I, A. G. 1710, 1723, 1727.
1920		(1925.0)		O. E. 1920		
Jan. 14	15 45. 5	7 4 27. 67	+13 27 26. 5	−2. 9	+ 3	Leip. I, A. G. 2706, 2708, 2740, 2741.
18	14 43. 0	7 0 33. 76	+13 36 17. 1	−2. 8	+ 3	Leip. I, A. G. 2672, 2680, 2686, 2691.
1922		(1925.0)		O. E. 1922		
Oct. 20	15 37. 0	1 28 8. 92	+ 8 47 23. 9	−1. 0	− 6	Leip. II, A. G. 564, 567, 568, 576.
24	15 20. 0	1 24 44. 21	+ 8 13 20. 2	−1. 0	− 6	Leip. II, A. G. 535, 539, 543, 552.

(69) HESPERIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1915		(1915.0)		B. J. 1917		
Sept. 10	16 7. 1	23 6 33. 78	− 1 15 32. 8	−3. 9	−21	Nicol., A. G. 5785, 5788, 5794.
13	15 14. 0	23 4 26. 02	− 1 35 35. 2	−3. 9	−21	Nicol., A. G. 5785, 5788, 5789.

(70) PANOPAEA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1917		(1917.0)		O. E. 1917		
Oct. 17	16 36. 2	2 20 19. 38	+ 7 56 49. 7	+1. 3	+15	Leip. II, A. G. 886, 899, 903.
21	16 21. 8	2 16 10. 64	+ 7 54 3. 4	+1. 3	+15	Leip. II, A. G. 867, 874, 878.
1920		(1925.0)		O. E. 1920		
Apr. 21	16 5. 5	13 16 27. 21	+ 0 37 56. 9	+0. 1	− 6	Nicol., A. G. 3560, 3566, 3568, ½ (Nicol., A. G. 3562+Alb., A. G. 4687).
24	15 57. 0	13 13 34. 92	+ 0 39 59. 4	+0. 1	− 6	Nicol., A. G. 3553, 3557, Alb., A. G. 4682, ½ (Nicol., A. G. 3562+Alb., A. G. 4687).

(72) FERONIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1920		(1925.0)		O. E. 1920		
Oct. 5	15 30. 3	0 19 24. 58	+ 5 38 41. 4	+0. 6	− 1	Leip. II, A. G. 95, 103, 124.
11	15 29. 0	0 14 39. 49	+ 4 43 5. 3	+0. 7	− 1	Leip. II, A. G. 69, Alb., A. G. 46, 49, 52.

(78) DIANA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Sept. 23	16 11. 6	23 52 56. 04	+ 5 52 54. 9	+0. 4	+ 4	Leip. II, A. G. 11814, 11829, 11837.
25	15 29. 0	23 51 4. 34	+ 5 46 7. 0	+0. 4	+ 4	Leip. II, A. G. 11809, 11810, 11814.
1918		(1918.0)		O. E. 1918		
Mar. 11	15 16. 1	9 58 45. 54	+11 4 44. 8	−1. 5	+12	Leip. I, A. G. 3922, 3926, 3931.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(81) TERPSICHORE						
		(1925.0)		O. E. 1922		
1922	h m	h m s	° ′ ″	m	′	
Oct. 19	16 2. 0	1 25 14. 64	+14 57 28. 2	−2. 6	−13	Ber. A, A. G. 418, Leip. I, A. G. 417, 429, 430, 431.
24	14 22. 0	1 20 36. 66	+14 51 34. 3	−2. 6	−13	Leip. I, A. G. 383, 396, ½ (Leip. I, A. G. 385+Ber. A, A. G. 386), ½ (Leip. I, A. G. 405+Ber. A, A. G. 408).
(84) KLIO						
1918		(1918.0)		O. E. 1918		
Feb. 11	16 19. 4	9 49 30. 57	+14 4 10. 5	+0. 1	− 3	Leip. I, A. G. 3881, 3884, 3898.
12	16 20. 6	9 48 26. 04	+14 7 34. 2	+0. 1	− 3	Leip. I, A. G. 3881, 3885, Ber. A, A. G. 3959.
(85) IO						
1917		(1917.0)		O. E. 1917		
Nov. 8	14 32. 3	2 3 17. 59	+ 7 31 17. 4	+1. 2	+ 1	Leip. II, A. G. 795, 796, 801.
9	15 7. 3	2 2 34. 14	+ 7 22 28. 0	+1. 2	+ 1	Leip. II, A. G. 795, 796, 798.
(86) SEMELE						
1917		(1917.0)		O. E. 1917		
Mar. 28	16 26. 5	12 3 14. 02	+ 6 46 7. 9	+0. 2	− 2	Leip. II, A. G. 6020, 6022, 6026.
30	16 38. 8	12 1 49. 16	+ 6 54 25. 2	+0. 2	− 2	Leip. II, A. G. 6020, 6022, 6026.
(88) THISBE						
1917		(1917.0)		O. E. 1917		
Sept. 13	16 57. 5	23 14 52. 49	+ 4 30 48. 0	−9. 6	−65	Alb., A. G. 8035, 8039, 8044.
17	15 36. 6	23 11 40. 83	+ 4 11 30. 0	−9. 5	−65	Alb., A. G. 8025, 8035, 8039.
(90) ANTIOPE						
1912		(1912.0)		B. J. 1914		
Dec. 13	15 39. 0	6 38 32. 90	+24 22 41. 2	−0. 6	0	Ber. B, A. G. 2541, 2553, 2556.
15	14 40. 1	6 36 57. 28	+24 25 10. 0	−0. 6	0	Ber. B, A. G. 2525, 2553, 2556.
30	15 21. 0	6 23 55. 99	+24 41 10. 6	−0. 7	0	Ber. B, A. G. 2404, 2413, 2416.
(91) AEGINA						
1918		(1918.0)		O. E. 1918		
Mar. 15	15 51. 9	11 21 4. 66	+ 5 28 50. 1	−0. 1	+ 3	Leip. II, A. G. 5788, 5795, 5798.
17	16 44. 2	11 19 16. 33	+ 5 38 20. 2	−0. 1	+ 3	Leip. II, A. G. 5782, 5788, 5791.
1920		(1925.0)		O. E. 1920		
Oct. 13	15 34. 3	0 17 37. 28	+ 1 54 7. 8	+0. 4	0	Alb., A. G. 48, 55, 63, 64, 67.
14	16 13. 2	0 16 47. 85	+ 1 49 50. 5	+0. 4	0	Alb., A. G. 48, 55, 65, Nicol., A. G. 43.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(92) UNDINA						
		(1917.0)		O. E. 1917		
1917	h m	h m s	° ′ ″	m	′	
May 12	15 14. 7	13 47 30. 22	+ 2 54 1. 0	− 2. 4	+14	Alb., A. G. 4800, 4811, 4813.
14	15 0. 7	13 46 18. 76	+ 2 54 49. 2	− 2. 4	+14	Alb., A. G. 4800, 4801, 4811.
1919		(1925.0)		O. M. No. 237		
Nov. 15	14 52. 6	1 27 4. 50	− 5 12 25. 0	− 0. 2	− 2	Strasz., A. G. 337, 344, 347.
17	14 29. 5	1 26 7. 05	− 5 10 8. 4	− 0. 2	− 2	Strasz., A. G. 337, 344, 347.
(93) MINERVA						
1922		(1925.0)		O. E. 1922		
Oct. 18	14 10. 0	0 18 16. 51	+ 3 57 22. 9	0. 0	+ 3	Alb., A. G. 53, 54, 57, 69.
20	14 32. 0	0 16 45. 32	+ 3 53 18. 7	0. 0	+ 3	Alb., A. G. 51, 53, 54, 56.
(94) AURORA						
1923		(1925.0)		O. E. 1923		
Sept. 16	16 17. 0	23 21 15. 00	− 7 22 8. 9	+ 1. 6	+15	Wien-Ottak., A. G. 8304, 8307, 8316, 8317.
17	16 51. 0	23 20 25. 48	− 7 24 41. 3	+ 1. 6	+15	Wien-Ottak., A. G. 8298, 8299, 8301, 8304, 8307.
(96) AEGLE						
1916		(1916.0)		B. J. 1918		
Mar. 4	14 39. 9	9 13 36. 50	+14 10 56. 0	− 4. 4	+28	Leip. I, A. G. 3698, 3700, 3703.
(97) KLOTHO						
1916		(1916.0)		B. J. 1918		
Mar. 31	16 10. 5	11 38 46. 85	+ 8 32 42. 6	− 2. 4	+23	Leip. II, A. G. 5895, 5900, 5905.
(100) HEKATE						
1918		(1918.0)		O. E. 1918		
Nov. 27	16 21. 4	3 41 14. 36	+10 49 25. 5	−10. 4	−39	Leip. I, A. G. 1083, 1088, 1094.
Dec. 5	15 0. 3	3 35 5. 56	+10 39 50. 2	−10. 2	−39	Leip. I, A. G. 1068, Leip. II, A. G. 1337, 1347.
(101) HELENA						
1922		(1925.0)		O. E. 1922		
Sept. 22	15 57. 0	23 35 23. 01	+ 2 3 19. 6	− 0. 3	+ 7	Alb., A. G. 8126, 8128, 8133, 8137.
25	16 15. 0	23 32 24. 40	+ 2 1 33. 8	− 0. 3	+ 7	Alb., A. G. 8114, 8116, 8118, 8119, 8128.
(103) HERA						
1922		(1925.0)		O. E. 1922		
Dec. 19	14 31. 0	5 0 1. 58	+15 45 55. 5	0. 0	0	Ber. A, A. G. 1373, 1379, 1386, 1388.
22	15 13. 0	4 57 18. 15	+15 47 16. 9	0. 0	0	Ber. A, A. G. 1367, 1373, 1379, 1386.

(110) LYDIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1917.0)		O. E. 1917		
1917	h m	h m s	° ′ ″	m	′	
Oct. 13	17 8. 1	1 39 53. 46	+ 4 29 14. 6	−1. 3	− 7	Alb., A. G. 487, 493, 504.
15	15 16. 2	1 38 9. 68	+ 4 23 20. 1	−1. 3	− 7	Alb., A. G. 480, 483, 487.

(115) THYRA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1917		(1917.0)		O. E. 1917		
Feb. 17	16 35. 0	9 31 41. 72	+ 8 48 39. 8	−0. 2	− 1	Leip. II, A. G. 5186, 5189, 5194.
20	15 51. 8	9 28 25. 42	+ 8 50 49. 0	−0. 2	− 1	Leip. II, A. G. 5150, 5161, 5163.

(116) SIRONA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1922		(1925.0)		O. E. 1922		
Oct. 20	15 37. 0	1 34 14. 04	+ 6 10 9. 0	−0. 3	0	Leip. II, A. G. 595, 608, 623, 626.
24	15 20. 0	1 30 49. 18	+ 5 54 4. 1	−0. 3	0	Leip. II, A. G. 570, 573, 582, 592.

(119) ALTHAEA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1915		(1915.0)		B. J. 1917		
Oct. 28	15 40. 3	1 8 31. 86	+ 7 0 57. 2	0. 0	− 2	Leip. II, A. G. 420, 423, 436.
29	14 26. 0	1 7 52. 52	+ 6 54 4. 8	0. 0	− 2	Leip. II, A. G. 420, 423, 436.
1917		(1917.0)		O. E. 1917		
Feb. 17	16 35. 0	9 24 36. 62	+ 7 1 48. 8	−0. 2	+ 1	Leip. II, A. G. 5131, 5139, 5143.
20	15 51. 8	9 22 4. 45	+ 7 19 14. 6	−0. 2	+ 1	Leip. II, A. G. 5118, 5122, 5125.

(121) HERMIONE

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Mar. 31	17 19. 5	13 15 48. 10	+ 1 29 13. 8	+3. 6	−27	Alb., A. G. 4682, 4694, 4695.
Apr. 10	17 9. 5	13 9 4. 13	+ 2 4 56. 8	+3. 6	−27	Alb., A. G. 4659, 4666, 4670.
29	14 44. 3	12 57 5. 46	+ 2 53 12. 0	+3. 6	−27	Alb., A. G. 4612, 4617, 4620.

(122) GERDA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Mar. 8	14 4. 3	9 53 9. 34	+11 47 18. 2	+4. 5	−21	Leip. I, A. G. 3899, 3912, 3915.
23	13 21. 5	9 45 25. 81	+12 36 24. 7	--	--	Leip. I, A. G. 3876, 3877, 3885.
1917		(1917.0)		O. E. 1917		
May 11	16 25. 6	15 38 38. 92	−17 27 14. 0	+5. 9	−19	Wash., A. G. 5745, 5749, 5752.
14	16 17. 7	15 36 18. 39	−17 18 18. 2	+5. 9	−19	Wash., A. G. 5726, 5731, 5741.
23	16 29. 0	15 29 17. 40	−16 51 40. 1	+5. 7	−19	Wash., A. G. 5700, 5703, 5709.
25	16 10. 5	15 27 47. 36	−16 45 42. 7	+5. 7	−19	Wash., A. G. 5693, 5700, 5703.

(123) BRUNHILD

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1921		(1925.0)		O. E. 1921		
Sept. 23	15 29. 0	23 49 34. 40	+ 8 0 6. 0	−0. 8	− 4	Leip. II, A. G. 11797, 11800, 11812, 11813.
28	15 45. 5	23 45 8. 88	+ 7 39 28. 1	−0. 8	− 4	Leip. II, A. G. 11771, 11778, 11783, 11793.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(123) BRUNHILD—Continued						
		(1925.0)		O. E. 1923		
1923	h m	h m s	° ′ ″	m	′	
Feb. 20	15 34. 0	9 4 23. 18	+14 24 27. 2	1. 2	+ 3	Leip. I, A. G. 3659, 3662, Ber. A, A. G. 3686, 3687, ½ (Leip. I, A. G. 3669+Ber. A, A. G. 3704).
21	14 54. 0	9 3 33. 53	+14 25 47. 6	1. 2	+ 3	Leip. I, A. G. 3659, 3662, Ber. A, A. G. 3686, 3687, ½ (Leip. I, A. G. 3652+Ber. A, A. G. 3674).
(124) ALKESTE						
1915		(1915.0)				
Sept. 15	18 15. 0	0 53 3. 68	+ 5 50 2. 4	---	--	Leip. II, A. G. 328, 330, 333.
16	18 47. 0	0 52 21. 06	+ 5 44 26. 0	---	--	Leip. II, A. G. 304, 328, 341.
(125) LIBERATRIX						
1918		(1918.0)		O. E. 1918		
Nov. 25	16 1. 5	3 13 30. 35	+11 28 0. 8	−1. 3	− 6	Leip. I, A. G. 975, 985, 988.
26	15 24. 5	3 12 42. 16	+11 24 53. 6	−1. 3	− 6	Leip. I, A. G. 975, 985, 988.
(126) VELLEDA						
1914		(1914.0)		B. J. 1916		
Nov. 17	16 47. 0	3 5 10. 98	+19 58 7. 8	−1. 4	− 5	Ber. A, A. G. 832, 836.
1916		(1916.0)		B. J. 1918		
Mar. 23	15 33. 0	10 53 11. 88	+ 9 52 46. 2	−1. 2	+ 7	Leip. I, A. G. 4156, 4157, 4164.
(127) JOHANNA						
1920		(1925.0)		O. E. 1920		
Mar. 24	15 41. 7	11 58 7. 66	+ 7 56 4. 1	−3. 7	+26	Leip. II, A. G. 5988, 5993, 5994, 6000.
27	16 58. 3	11 55 23. 75	+ 8 3 0. 5	−3. 7	+26	Leip. II, A. G. 5970, 5971, 5984, 5988.
(128) NEMESIS						
1915		(1915.0)		B. J. 1917		
Mar. 13	16 11. 0	10 50 51. 23	+17 17 12. 4	−0. 1	0	Ber. A, A. G. 4292, 4297, 4298.
17	14 27. 0	10 47 43. 26	+17 31 35. 1	−0. 1	0	Ber. A, A. G. 4275, 4284, 4287.
1920		(1925.0)		O. E. 1920		
Apr. 14	16 0. 0	12 55 7. 01	+ 2 46 37. 6	−0. 1	0	Alb., A. G. 4610, 4612, 4614, 4617.
21	14 45. 0	12 49 46. 12	+ 3 8 2. 0	0. 0	0	Alb., A. G. 4586, 4597, 4599, 4600.
(129) ANTIGONE						
1917		(1917.0)		O. E. 1917		
Mar. 12	15 3. 0	10 48 15. 95	+16 41 23. 3	+6. 3	+ 2	Ber. A, A. G. 4283, 4285, 4288.
15	15 5. 0	10 46 1. 01	+17 5 44. 2	+6. 3	+ 2	Ber. A, A. G. 4266, 4275, 4283.
(130) ELEKTRA						
1917		(1917.0)		O. E. 1917		
Feb. 24	15 5. 8	10 7 57. 96	+14 27 43. 8	−3. 2	+ 4	Leip. I, A. G. 3963, 3964, 3970.
Mar. 12	14 16. 0	9 57 19. 86	+16 34 43. 4	−3. 2	+ 3	Ber. A, A. G. 4000, 4012, 4019.

(131) VALA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1916.0)		B. J. 1918		
1916	h m	h m s	° ′ ″	m	′	
Nov. 18	15 42. 2	2 53 29. 72	+14 16 49. 8	-3. 5	17	Leip. I, A. G. 883, 884, 887.

(132) AETHRA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1922		(1925.0)		B. Z. 1923		
Dec. 22	16 0. 6	5 42 58. 56	+14 46 35. 3	---	--	Leip I, A. G. 1788, 1797, 1801, Ber. A, A. G. 1695.
23	14 58. 0	5 41 42. 44	+14 25 33. 3	---	--	Leip. I, A. G. 1779, 1786, 1788, 1797.
24	15 36. 0	5 40 21. 28	+14 2 59. 2	---	--	Leip. I, A. G. 1764, 1776, 1781, 1786.
26	14 43. 0	5 37 47. 14	+13 20 6. 8	---	--	Leip. I, A. G. 1750, 1752, 1759, 1760.
29	15 1. 9	5 33 55. 90	+12 14 55. 6	---	--	Leip. I, A. G. 1713, 1715, 1716, 1718, 1720, 1733.
29	15 40. 9	5 33 53. 70	+12 14 20. 5	---	--	Leip. I, A. G. 1713, 1715, 1716, 1718, 1720, 1733.
1923						
Jan. 5	15 43. 0	5 25 39. 44	+ 9 48 53. 0	+0. 1	− 3	Leip. II, A. G. 2196, 2198, Leip. I, A. G. 1656, 1657, 1662, 1667.
8	14 13. 0	5 22 36. 43	+ 8 51 24. 6	+0. 1	− 3	Leip. II, A. G. 2165, 2174, 2177, 2179, 2182, 2185, 2191, 2195.
9	14 38. 0	5 21 37. 00	+ 8 32 7. 9	+0. 1	− 3	Leip. II, A. G. 2164, 2165, 2167, 2176, 2180, 2182, 2185, 2191.
13	13 44. 1	5 18 7. 42	+ 7 20 15. 0	+0. 2	− 3	Leip. II, A. G. 2132, 2137, 2138, 2148, 2152, 2155, 2157, 2158.
13	15 14. 0	5 18 4. 18	+ 7 19 8. 3	+0. 2	− 3	Leip. II, A. G. 2132, 2137, 2138, 2148, 2152, 2155, 2157, 2158.
19	14 5. 5	5 14 2. 35	+ 5 41 57. 5	+0. 3	− 3	Leip. II, A. G. 2094, 2099, 2101, 2108, 2116, 2122.
22	14 11. 0	5 12 35. 50	+ 4 58 0. 6	+0. 3	− 3	Leip. II, A. G. 2092, 2101, 2108, Alb., A. G. 1625, 1640, 1643, 1648.
24	13 26. 0	5 11 51. 91	+ 4 31 2. 3	+0. 2	− 2	Alb., A. G. 1611, 1613, 1625, 1628, 1640, 1643.
Feb. 8	12 3. 0	5 12 2. 04	+ 1 51 34. 0	−0. 1	− 4	Alb., A. G. 1618, 1624, 1627, 1630, 1637, 1639, 1642.
14	13 53. 0	5 14 50. 78	+ 1 6 39. 7	0. 0	− 4	Nicol., A. G. 1263, Alb., A. G. 1654, 1660, ½ (Nicol., A. G. 1264+Alb., A. G. 1651), ½ (Nicol., A. G. 1267+Alb., A. G. 1658).
16	13 35. 0	5 16 5. 46	+ 0 53 59. 4	0. 0	− 4	Nicol., A. G. 1268, 1275, 1276, ½ (Alb., A. G. 1651+Nicol., A. G. 1264), ½ (Alb., A. G. 1658+Nicol., A. G. 1267), ½ (Alb., A. G. 1665+Nicol., A. G. 1277).
19	12 47. 0	5 18 14. 00	+ 0 36 44. 8	0. 0	− 4	Nicol., A. G. 1276, 1284, 1285, 1288, 1290, ½ (Nicol., A. G. 1277+Alb., A. G. 1665).
21	13 2. 0	5 19 52. 20	+ 0 26 8. 2	0. 0	− 4	Nicol., A. G. 1285, 1290, 1295, 1300, 1304.
Mar. 8	12 25. 0	5 36 23. 88	− 0 32 47. 0	+0. 1	− 5	Nicol., A. G. 1430, 1441, 1448, 1449, 1452.
9	12 40. 0	5 37 45. 90	− 0 35 49. 9	−0. 1	− 5	Nicol., A. G. 1441, 1448, 1449, 1452, 1459.
14	12 35. 0	5 44 56. 21	− 0 49 32. 9	−0. 2	− 5	Nicol., A. G. 1471, 1473, 1474, 1478, 1481.
17	12 20. 0	5 49 32. 92	− 0 57 2. 0	−0. 4	− 7	Nicol., A. G. 1490, 1492, 1497, 1501, 1504, 1505.
20	12 13. 0	5 54 24. 06	− 1 4 8. 9	−0. 6	− 7	Nicol., A. G. 1504, 1508, 1514, 1518, 1519, 1520.
21	12 18. 0	5 56 4. 40	− 1 6 27. 4	−0. 6	− 7	Nicol., A. G. 1514, 1519, 1520, 1522, 1523.
24	12 27. 0	6 1 14. 23	− 1 13 19. 0	−0. 6	− 8	Nicol., A. G. 1531, 1536, 1537, 1538, 1542, 1549.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(133) CYRENE						
		(1916.0)		B. J. 1918		
1916	h m	h m s	° ′ ″	m	′	
Sept. 20	16 27. 5	23 22 45. 52	+ 2 15 6. 7	+0. 5	+ 4	Alb., A. G. 8070, 8072, 8076.
21	16 1. 5	23 22 0. 06	+ 2 11 32. 2	+0. 5	+ 4	Alb., A. G. 8070, 8072, 8076.
(135) HERTHA						
1923		(1925.0)		O. E. 1923		
Mar. 9	14 26. 0	9 48 17. 82	+13 59 9. 1	0. 0	− 2	Leip. I, A. G. 3879, 3881, 3884, 3898, ½ (Leip. I, A. G. 3887+Ber. A, A. G. 3959).
10	14 44. 0	9 47 28. 73	+14 2 34. 6	0. 0	− 2	Leip. I, A. G. 3873, 3879, 3881, 3884, ½ (Leip. I, A. G. 3887+Ber. A, A. G. 3959).
(136) AUSTRIA						
1920		(1925.0)		O. E. 1920		
Sept. 15	16 29. 0	23 55 40. 54	+ 2 48 22. 6	+3. 4	+ 6	Alb., A. G. 8207, 8213, 8223, 8225.
17	16 22. 0	23 54 5. 66	+ 2 25 7. 3	+3. 5	+ 7	Alb., A. G. 8206, 8209, 8211, 8214, 8223.
(138) TOLOSA						
1917		(1917.0)		O. E. 1917		
Nov. 7	15 16. 2	2 35 34. 92	+14 1 23. 3	+5. 5	+32	Leip. I, A. G. 768, 770, 775.
8	15 22. 8	2 34 33. 56	+13 58 13. 4	+5. 5	+32	Leip. I, A. G 765, 768, 775.
1923		(1925.0)		O. E. 1923		
Mar. 14	14 54. 0	10 13 54. 60	+15 59 37. 1	+5. 9	−34	Ber. A, A. G. 4094, 4096, 4098, 4102, 4113.
17	14 3. 0	10 11 33. 14	+16 9 14. 8	+5. 9	−34	Ber. A, A. G. 4073, 4081, 4084, 4086, 4094.
(140) SIWA						
1915		(1915.0)		B. J. 1917		
Nov. 27	14 56. 0	4 7 23. 94	+17 34 16. 7	+0. 9	+ 3	Ber. A, A. G. 1103, 1106, 1108.
Dec. 6	15 26. 5	3 58 52. 61	+17 18 32. 0	+0. 8	+ 3	Ber. A, A. G. 1062, 1076, 1079.
(142) POLANA						
1922		(1925.0)		O. E. 1922		
Oct. 25	16 53. 0	1 58 22. 96	+15 45 20. 5	−1. 5	−10	Ber. A, A. G. 576, 583, Leip. I, A. G. 603, 606.
27	16 45. 0	1 56 26. 70	+15 34 37. 3	−1. 5	−10	Ber. A, A. G. 571, 573, Leip. I, A. G. 606, ½ (Ber. A, A. G. 570+Leip. I, A. G. 595).
(145) ADEONA						
1916		(1916.0)		B. J. 1918		
Nov. 1	17 14. 4	3 4 5. 36	+ 4 56 41. 4	−1. 8	+ 1	Alb., A. G. 894, 901, 905.
2	16 44. 0	3 3 7. 58	+ 4 56 10. 9	−1. 8	+ 1	Alb., A. G. 887, 894, 901.

(147) PROTOGENEIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1915.0)		B. J. 1917		
1915	h m	h m s	° ′ ″	m	′	
Nov. 7	15 18. 8	2 3 3. 18	+14 8 46. 1	+4. 2	+17	Leip. I, A. G. 627, 628, 633.
24	12 41. 6	1 52 26. 46	+12 59 27. 3	+4. 1	+18	Leip. I, A. G. 575, 585, 588.

(148) GALLIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
June 26	17 0. 0	18 49 30. 99	+ 4 32 54. 4	+1. 5	−13	Alb., A. G. 6394, 6402, 6421.

(149) MEDUSA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1917		(1917.0)		O. E. 1917		
Nov. 7	16 20. 2	3 15 38. 80	+16 20 48. 6	+1. 0	+ 5	Ber. A, A. G. 893, 895, 901.
8	16 16. 8	3 14 34. 56	+16 16 16. 4	+1. 0	+ 5	Ber. A, A. G. 888, 893, 895.
1920		(1925.0)		O. E. 1920		
Oct. 5	16 45. 7	0 32 59. 97	+ 2 31 43. 6	+2. 6	+15	Alb., A. G. 117, 120, 126, 131.

(153) HILDA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1922		(1925.0)		O. E. 1922		
Oct. 25	16 53. 0	2 3 18. 86	+15 21 54. 0	+0. 1	− 2	Leip. I, A. G. 620, 629, Ber. A, A. G. 603, ½ (Leip. I, A. G. 630+Ber. A, A. G. 604).
27	16 45. 0	2 2 3. 84	+15 12 46. 3	+0. 1	− 2	Ber. A, A. G. 592, ½ (Leip. I, A. G. 630+Ber. A, A. G. 604), ½ (Leip. I, A. G. 620+Ber. A, A. G. 591), ½ (Leip. I, A. G. 629+Ber. A, A. G. 601).

(158) KORONIS

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1920		(1925.0)		O. E. 1920		
Feb. 16	15 17. 0	8 50 35. 32	+16 46 27. 0	−3. 0	+12	Ber. A, A. G. 3563, 3584, 3590, 3592.
17	14 21. 1	8 49 49. 74	+16 49 21. 2	−3. 0	+12	Ber. A, A. G. 3563, 3567, 3573, 3584.
1923		(1925.0)		O. E. 1923		
Nov. 10	15 37. 0	2 42 5. 50	+17 5 42. 8	−2. 3	−10	Ber. A, A. G. 735, 738, 742, 745, 747, 750, 753.
13	14 52. 0	2 39 32. 55	+16 53 11. 2	−2. 3	−10	Ber. A, A. G. 730, 731, 738, 742, 747, 750.

(160) UNA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1921		(1925.0)		O. E. 1921		
Feb. 14	16 35. 0	9 59 43. 91	+16 40 1. 1	−0. 7	+ 2	Ber. A, A. G. 4015, 4019, 4024, 4031.
15	17 3. 5	9 58 47. 11	+16 43 52. 6	−0. 6	+ 3	Ber. A, A. G. 4015, 4019, 4024, 4031.

(161) ATHOR

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1914		(1914.0)		B. J. 1916		
Nov. 19	16 47. 1	4 7 21. 48	+31 32 50. 3	+0. 2	+ 3	Leid., A. G. 1584, 1593.
1921		(1925.0)		O. E. 1921		
Oct. 6	16 53. 5	1 6 47. 12	+ 6 12 33. 1	−1. 4	− 9	Leip. II, A. G. 416, 427, 428.
8	16 50. 0	1 4 35. 12	+ 6 10 32. 8	−1. 4	− 9	Leip. II, A. G. 397, 403, 416.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(162) LAURENTIA						
		(1925.0)		O. E. 1923		
1923	h m	h m s	° ′ ″	m	′	
Apr. 16	14 53. 0	11 49 15. 21	+ 6 26 35. 9	+0. 8	− 6	Leip. II, A. G. 5938, 5943, 5954, 5955, 5957.
19	15 55. 0	11 47 45. 39	+ 6 25 13. 2	+0. 8	− 6	Leip. II, A. G. 5926, 5931, 5938, 5943, 5954.
(163) ERIGONE						
1919		(1925.0)		O. E. 1918		
Jan. 4	15 1. 5	5 28 26. 05	+14 30 28. 2	−7. 2	− 7	Leip. I, A. G. 1671, 1675, 1685, 1691, 1693.
6	14 29. 1	5 27 1. 87	+14 36 33. 4	−7. 2	− 7	Leip. I, A. G. 1671, 1672, 1675.
1923		(1925.0)		O. E. 1923		
Mar. 24	15 21. 0	10 52 15. 24	+ 8 56 37. 9	−4. 8	+24	Ast. Toulouse +9° 10^h 52^m, 12, 14, 16, 23, 41, 113, 120.
Apr. 6	14 40. 0	10 46 16. 21	+10 1 52. 5	−4. 1	+22	Leip. I, A. G. 4113, 4122, 4129, 4136, Leip. II, A. G. 5607.
(167) URDA						
1915		(1915.0)		B. J. 1917		
Sept. 15	18 15. 0	0 59 29. 15	+ 5 3 33. 7	---		Alb., A. G. 276, 279, ½ (Alb., A. G. 266+Leip. II, A. G. 369).
16	18 47. 0	0 58 50. 36	+ 4 58 36. 8	---	--	Alb., A. G. 261, Leip. II, A. G. 381, ½ (Alb., A. G. 266+Leip. II, A. G. 369).
Oct. 27	14 18. 0	0 29 23. 48	+ 1 24 48. 2	−9. 6	−58	Alb., A. G. 104, 124, Nicol., A. G. 89.
Nov. 1	15 29. 0	0 26 44. 71	+ 1 6 19. 6	−9. 4	−57	Nicol., A. G. 74, 77, 83.
(168) SIBYLLA						
1922		(1925.0)		O. E. 1922		
Jan. 30	16 10. 0	8 28 30. 63	+12 27 7. 9	−3. 3	+12	Leip. I, A. G. 3432, 3434, 3436, 3456.
31	15 54. 0	8 27 46. 55	+12 30 14. 4	−3. 3	+12	Leip. I, A. G. 3432, 3433, 3434, 3436.
(169) ZELIA						
1918		(1918.0)		O. E. 1918		
Mar. 2	15 50. 3	10 11 53. 78	+14 24 54. 5	0. 0	− 5	Leip. I, A. G. 3970, 3976, 3988, Ber. A, A. G. 4099.
5	15 19. 8	10 8 56. 76	+14 34 21. 9	+0. 1	− 5	Leip. I, A. G. 3970, Ber. A, A. G. 4067, 4076.
(173) INO						
1917		(1917.0)		O. E. 1917		
June 13	15 11. 6	15 35 13. 42	+ 1 26 31. 1	−0. 8	+ 1	Alb., A. G. 5249, 5251, 5259.
18	15 24. 1	15 32 9. 56	+ 1 17 25. 7	−0. 8	+ 2	Alb., A. G. 5246, Nicol., A. G. 3952, 3955.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(176) IDUNA						
		(1925.0)		O. E. 1921		
1921	h m	h m s	° ′ ″	m	′	
June 12	15 43. 0	16 39 27. 14	+ 3 5 59. 2	−0. 3	+ 1	Alb., A. G. 5515, 5532, 5534, 5540.
14	15 58. 0	16 38 1. 12	+ 3 11 20. 4	−0. 3	+ 1	Alb., A. G. 5515, 5519, 5530, 5532.
27	15 8. 0	16 29 35. 17	+ 3 28 50. 5	−0. 3	+ 1	Alb., A. G. 5476, 5480, 5488, 5489.
(177) IRMA						
1923		(1925.0)		O. E. 1923		
Oct. 13	15 43. 0	1 8 5. 71	+ 8 43 10. 5	−0. 2	− 2	Leip. II, A. G. 414, 417, 421, 425, 431, 439.
17	16 32. 0	1 4 52. 21	+ 8 26 48. 3	−0. 2	− 2	Leip. II, A. G. 399, 401, 402, 407, 413, 414.
(180) GARUMNA						
1921		(1925.0)		O. E. 1921		
Sept. 30	15 57. 0	0 40 54. 60	+ 5 37 35. 0	+1. 4	+ 9	Leip. II, A. G. 244, 246, 253, ½ (Leip. II, A. G. 247+Alb., A. G. 180), ½ (Leip. II, A. G. 255+Alb., A. G. 189).
Oct. 1	15 59. 0	0 40 3. 79	+ 5 32 27. 7	+1. 4	+ 9	Leip. II, A. G. 233, 235, 246, Alb., A. G. 172, 180.
(184) DEJOPEJA						
1915		(1915.0)		B. J. 1917		
Oct. 12	16 24. 3	1 7 23. 24	+ 8 25 4. 8	−1. 1	− 8	Leip. II, A. G. 422, 425, 426.
27	15 30. 0	0 56 49. 13	+ 7 21 32. 2	−1. 0	− 8	Leip. II, A. G. 350, 353, 368.
1918		(1918.0)		O. E. 1918		
Mar. 11	15 58. 6	11 12 53. 03	+ 4 34 28. 3	−7. 7	+51	Leip. II, A. G. 5748, 5752, Alb., A. G. 4234.
15	15 51. 9	11 9 52. 58	+ 4 51 59. 2	−7. 7	+51	Leip. II, A. G. 5730, 5736, 5747.
17	16 44. 2	11 8 22. 62	+ 5 0 46. 0	−7. 7	+51	Leip. II, A. G. 5715, 5725, 5730.
(189) PHTHIA						
1920		(1925.0)		O. E. 1920		
Sept. 13	15 13. 0	23 3 21. 57	− 0 30 8. 4	+5. 9	+27	Nicol., A. G. 5781, 5782, 5783.
14	14 29. 0	23 2 32. 18	− 0 37 56. 3	+5. 8	+27	Nicol., A. G. 5775, 5781, 5782, 5783.
1922		(1925.0)		O. E. 1922		
Jan. 30	14 42. 0	7 57 40. 37	+12 13 18. 2	+0. 8	0	Leip. I, A. G. 3197, 3212, 3215, 3216.
31	14 27. 0	7 56 44. 76	+12 17 19. 2	+0. 8	0	Leip. I, A. G. 3196, 3197. 3206, 3212.
(191) KOLGA						
1915		(1915.0)		B. J. 1917		
Feb. 18	17 10. 0	10 2 36. 42	+ 8 44 48. 8	−3. 5	+15	Leip. II, A. G. 5359, 5361, 5373.
19	16 39. 1	10 1 50. 99	+ 8 52 20. 0	−3. 5	+15	Leip. II, A. G. 5356, 5359, 5361.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(194) PROKNE						
		(1917.0)		O. E. 1917		
1917	h m	h m s	° ′ ″	m	′	
Mar. 24	16 12. 3	11 39 32. 06	+10 35 40. 2	+1. 1	+ 8	Leip. I, A. G. 4376, 4382, 4383.
27	16 16. 4	11 37 13. 64	+11 2 52. 6	+1. 1	+ 8	Leip. I, A. G. 4365, 4377, 4378.
(195) EURYKLEIA						
1920		(1925.0)		O. E. 1920		
Oct. 5	16 45. 7	0 36 17. 07	+ 4 34 42. 1	−0. 4	+ 3	Alb., A. G. 135, 145, 147, 148.
15	15 58. 6	0 27 59. 56	+ 4 4 19. 6	−0. 4	+ 3	Alb., A. G. 91, 93, 98, 103.
(196) PHILOMELA						
1923		(1925.0)		O. E. 1923		
Apr. 18	16 18. 5	12 28 48. 31	+ 6 52 59. 1	−0. 7	+ 4	Leip. II, A. G. 6140, 6142, 6156, 6169, 6171.
20	15 18. 0	12 27 33. 01	+ 6 56 8. 9	−0. 7	+ 4	Leip. II, A. G. 6138, 6140, 6142, 6146, 6156.
(198) AMPELLA						
1918		(1918.0)		O. E. 1918		
Sept. 9	15 47. 1	22 9 13. 06	+ 8 25 14. 6	+0. 1	− 1	Leip. II, A. G. 11155, 11164, 11175.
(199) BYBLIS						
1915		(1915.0)		B. J. 1917		
Dec. 10	14 56. 1	4 41 14. 66	+15 57 46. 0	+0. 6	+ 5	Ber. A, A. G. 1282, 1291, 1299.
(200) DYNAMENE						
1920		(1925.0)		O. E. 1920		
Sept. 13	15 13. 0	22 59 8. 07	− 1 46 15. 1	−0. 2	+ 1	Strasz., A. G. 7957, 7959, 7972, Nicol., A. G. 5773.
14	14 29. 0	22 58 14. 31	− 1 48 59. 8	−0. 2	0	Strasz., A. G. 7957, 7959, Nicol., A. G. 5773, 5774.
(201) PENELOPE						
1916		(1916.0)		B. J. 1917		
Jan. 2	14 20. 0	6 15 20. 54	+15 47 23. 2	−2. 5	− 1	Ber. A, A. G. 2058, 2069, 2083.
24	12 54. 0	5 57 57. 64	+16 36 25. 4	---	--	Ber. A, A. G. 1854, 1856, 1876.
1917		(1917.0)		O. E. 1917		
Mar. 19	15 51. 2	11 12 37. 50	+ 7 9 38. 4	−0. 1	+ 1	Leip. II, A. G. 5742, 5753, 5755.
22	15 43. 9	11 10 20. 41	+ 7 27 55. 4	−0. 1	+ 1	Leip. II, A. G. 5726, 5741, 5742.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
			(206) HERSILIA			
		(1925.0)		O. E. 1919		
1919	h m	h m s	° ′ ″	m	′	
July 25	15 36. 9	19 27 9. 85	−18 56 10. 2	+0. 4	− 2	Alger Cat. (1900) 8334, 8343, 8347, 8360, 8365, 8368.
30	15 43. 6	19 23 3. 40	−19 11 40. 3	+0. 4	− 2	Alger Cat. (1900) 8291, 8299, 8314, 8318, 8322, 8334, 8335.
Aug. 2	15 1. 0	19 20 46. 50	−19 20 38. 6	+0. 4	− 2	Alger Cat. (1900) 8266, 8281, 8282, 8291, 8297, 8299, 8314.
1922		(1925.0)		O. E. 1922		
Feb. 24	15 43. 8	9 31 24. 41	+14 45 8. 3	−0. 4	+ 4	Ber. A, A. G. 3858, 3860, 3867, Leip. I, A. G. 3801.
27	14 26. 0	9 29 8. 52	+15 0 22. 4	−0. 4	+ 4	Ber. A, A. G. 3844, 3854, 3858.
			(208) LACRIMOSA			
1923		(1925.0)		O. E. 1923		
Oct. 9	15 49. 0	0 31 6. 79	+ 3 39 16. 8	+1. 7	+12	Alb., A. G. 100, 103, 111, 115, 118, 119.
11	15 54. 0	0 29 32. 92	+ 3 30 23. 3	+1. 7	+12	Alb., A. G. 97, 100, 103, 111, 115, 118, 119.
			(211) ISOLDA			
1921		(1925.0)		O. E. 1921		
Oct. 22	14 34. 0	0 59 28. 32	+12 12 27. 3	−1. 3	−10	Leip. I, A. G. 271, 275, 284, 288.
24	15 13. 0	0 58 0. 21	+12 0 52. 4	−1. 4	−10	Leip. I, A. G. 263, 266, 267, 271.
26	14 45. 0	0 56 36. 99	+11 49 34. 7	−1. 4	−10	Leip. I, A. G. 257, 260, 266, 267.
Nov. 4	14 31. 0	0 51 3. 98	+11 0 11. 8	−1. 4	−11	Leip. I, A. G. 240, 242, 251, 253.
			(213) LILAEA			
1917		(1917.0)		O. E. 1917		
Apr. 13	16 12. 3	13 32 54. 70	+ 1 52 4. 3	− 0. 5	+ 4	Alb., A. G. 4756, 4764, 4767.
May 10	14 49. 5	13 13 9. 67	+ 3 26 13. 4	− 0. 4	+ 2	Alb., A. G. 4672, 4691, 4692.
1921		(1925.0)		O. E. 1921		
Feb. 14	16 35. 0	10 10 45. 81	+15 56 38. 6	+ 1. 2	0	Ber. A, A. G. 4083, 4084, 4086, 4094.
15	17 3. 5	10 9 54. 69	+16 3 15. 8	+ 1. 2	0	Ber. A, A. G. 4073, 4079, 4080, 4083, 4084.
			(214) ASCHERA			
1918		(1918.0)		O. E. 1918		
Mar. 15	15 51. 9	11 20 8. 37	+ 3 20 7. 6	−10. 9	+80	Alb., A. G. 4259, 4262, 4274.
17	16 44. 2	11 18 19. 26	+ 3 28 40. 8	−10. 9	+80	Alb., A. G. 4250, 4251, 4259.
			(219) THUSNELDA			
1916		(1916.0)		B. J. 1918		
Sept. 19	15 36. 5	23 0 6. 10	+ 5 38 54. 7	− 1. 4	−14	Leip. II, A. G. 11509, 11517, Alb., A. G. 7970.
20	14 32. 5	22 59 39. 04	+ 5 24 34. 6	− 1. 4	−14	Leip. II, A. G. 11501, Alb., A. G. 7970, 7972.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(225) HENRIETTA						
		(1915.0)		B. J. 1917		
1915	h m	h m s	° ′ ″	m	′	
Oct. 30	15 42. 1	1 27 37. 89	+ 5 41 2. 8	+ 0. 1	− 4	Leip. II, A. G. 560, 570, 573.
Nov. 3	14 58. 0	1 25 16. 37	+ 5 6 3. 2	+ 0. 1	− 4	Alb., A. G. 402, 411, Leip. II, A. G. 549.
(230) ATHAMANTIS						
1915		(1915.0)				
July 14	18 23. 2	22 1 26. 97	+ 3 26 19. 3	---	--	Alb., A. G. 7682, 7693, 7700.
18	18 39. 0	21 59 49. 72	+ 3 40 48. 3	---	--	Alb., A. G. 7675, 7679, 7682.
(232) RUSSIA						
1920		(1925.0)		O. E. 1920		
Apr. 14	16 0. 0	12 54 48. 24	+ 2 53 51. 0	+ 7. 8	−33	Alb., A. G. 4610, 4612, 4614, 4617.
21	14 45. 0	12 50 11. 91	+ 3 34 14. 1	+ 7. 6	−33	Alb., A. G. 4586, 4599, 4602, 4605.
(233) ASTEROPE						
1915		(1915.0)		B. J. 1917		
Nov. 27	14 56. 0	4 7 58. 98	+16 19 50. 0	− 3. 1	− 8	Ber. A, A. G. 1102, 1104, 1111.
Dec. 6	15 26. 5	3 59 43. 34	+15 33 49. 8	− 3. 1	− 8	Ber. A, A. G. 1073, 1080, 1082.
(234) BARBARA						
1915		(1915.0)		B. J. 1917		
Mar. 13	16 11. 0	10 53 24. 34	+15 21 28. 8	+ 0. 6	+ 4	Ber. A, A. G. 4310, 4311, 4318.
17	14 27. 0	10 50 5. 76	+15 53 49. 3	+ 0. 6	+ 4	Ber. A, A. G. 4288, 4295, 4296.
1916		(1916.0)		B. J. 1918		
June 22	16 36. 5	18 15 39. 83	+ 0 33 48. 4	+ 1. 7	− 4	Nicol., A. G. 4542, 4544, 4557.
25	16 2. 9	18 12 53. 16	+ 0 18 9. 8	+ 1. 7	− 4	Nicol., A. G. 4528, 4530, 4542.
(236) HONORIA						
1916		(1916.0)		B. J. 1918		
Mar. 9	15 49. 2	9 39 49. 03	+ 7 34 28. 6	− 3. 1	+15	Leip. II, A. G. 5221, 5231, 5235.
11	15 27. 0	9 38 37. 00	+ 7 45 42. 2	− 3. 1	+15	Leip. II, A. G. 5218, 5221, 5231.
(239) ADRASTEA						
1915		(1915.0)		B. J. 1917		
Sept. 15	18 15. 0	0 58 46. 66	+ 5 27 31. 5	----	--	Leip. II, A. G. 365, 395, ½ (Alb., A. G. 266+Leip. II, A. G. 369).
16	18 47. 0	0 58 18. 42	+ 5 20 38. 7	----	--	Leip. II, A. G. 365, 381, ½ (Alb., A. G. 266+Leip. II, A. G. 369).
Oct. 27	14 18. 0	0 33 54. 70	+ 0 16 54. 1	+19. 0	+83	Nicol., A. G. 92, 97, 102.
Nov. 1	15 29. 0	0 31 59. 91	− 0 8 54. 8	+18. 6	+80	Nicol., A. G. 92, 95, 97.
1922		(1925.0)		O. E. 1922		
Jan. 30	16 10. 0	8 37 51. 66	+10 58 37. 1	+ 1. 7	− 5	Leip. I, A. G. 3500, 3504, 3516.
31	15 54. 0	8 37 0. 96	+11 3 18. 6	+ 1. 7	− 5	Leip. I, A. G. 3500, 3504, 3510, 3512.

(240) VANADIS

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1925.0)		O. M. No. 224		
1919	h m	h m s	° ′ ″	m	′	
Oct. 27	13 36. 6	0 10 12. 44	− 2 43 19. 4	− 0. 1	0	Strasz., A. G. 29, 31, 42.

(241) GERMANIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Sept. 23	16 57. 7	0 5 22. 52	+ 9 59 48. 4	− 0. 1	− 1	Leip. II, A. G. 14, 23, 30.
26	15 58. 1	0 3 7. 09	+ 9 45 4. 9	− 0. 1	− 1	Leip. II, A. G. 11873, 11874, 14.

(242) KRIEMHILD

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1917		(1917.0)		O. E. 1917		
Aug. 10	16 22. 0	21 11 9. 10	− 0 10 27. 6	+ 1. 1	+ 3	Nicol., A. G. 5395, 5398, 5410.
13	16 15. 7	21 8 50. 94	− 0 24 36. 6	+ 1. 1	+ 3	Nicol., A. G. 5392, 5395, 5398.

(245) VERA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1916		(1916.0)		A. N. No. 4862		
Oct. 24	15 43. 4	1 57 0. 38	+ 7 3 40. 3	− 3. 7	−25	Leip. II, A. G. 762, 771, 778.
26	16 1. 4	1 55 19. 92	+ 6 59 33. 4	− 3. 7	−25	Leip. II, A. G. 749, 752, 766.
27	15 11. 4	1 54 31. 96	+ 6 57 36. 8	− 3. 7	−25	Leip. II, A. G. 752, 762, 766.
Nov. 1	14 43. 9	1 50 29. 72	+ 6 48 54. 6	− 3. 7	−25	Leip. II, A. G. 728, 733, 738.
3	14 59. 0	1 48 55. 72	+ 6 46 3. 2	− 3. 7	−25	Leip. II, A. G. 710, 714, 728.
15	14 54. 5	1 40 53. 06	+ 6 38 11. 6	----	--	Leip. II, A. G. 657, 665, 667.
16	14 13. 0	1 40 21. 39	+ 6 38 19. 9	----	--	Leip. II, A. G. 657, 665, 667.
25	13 47. 3	1 36 31. 76	+ 6 46 5. 6	----	--	Leip. II, A. G. 626, 631, 639.
27	13 44. 5	1 35 57. 60	+ 6 49 24. 8	----	--	Leip. II, A. G. 625, 629, 639.
Dec. 7	11 18. 3	1 34 45. 01	+ 7 14 22. 4	----	--	Leip. II, A. G. 610, 620, 625.
8	11 18. 3	1 34 46. 66	+ 7 17 40. 7	----	--	Leip. II, A. G. 610, 620, 625.

(248) LAMEIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1921		(1925.0)		O. E. 1921		
Oct. 22	15 47. 0	1 29 6. 97	+13 49 21. 8	−6. 5	−33	Leip. I, A. G. 450, 451, 459, 461.
24	16 27. 0	1 27 18. 12	+13 35 39. 0	−6. 5	−33	Leip. I, A. G. 424, 434, 440, 451.

(250) BETTINA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Mar. 23	16 39. 5	12 3 46. 14	+ 8 46 44. 0	−0. 5	+ 4	Leip. II, A. G. 6013, 6018, 6027.
30	15 57. 0	11 57 51. 34	+ 8 55 14. 2	−0. 4	+ 4	Leip. II, A. G. 5998, 6000, 6002.
Apr. 9	15 17. 0	11 50 11. 68	+ 8 57 30. 0	−0. 4	+ 4	Leip. II, A. G. 5949, 5951, 5959.
12	15 24. 0	11 48 9. 94	+ 8 55 41. 8	−0. 4	+ 4	Leip. II, A. G. 5947, 5949, 5951.

(257) SILESIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Oct. 27	16 28. 4	2 39 25. 23	+15 57 3. 6	+7. 6	+46	Ber. A, A. G. 727, 730, 736.
28	15 43. 9	2 38 36. 52	+15 54 43. 4	+7. 6	+46	Ber. A, A. G. 727, 730, 736.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(258) TYCHE						
		(1925.0)		O. E. 1921		
1921	h m	h m s	° ′ ″	m	′	
Oct. 8	15 52. 0	1 7 16. 51	+12 21 18. 4	−0. 2	+ 3	Leip. I, A. G. 311, 317, 326, 332.
21	14 37. 0	0 59 8. 20	+ 9 10 54. 3	−0. 2	+ 3	Leip. II, A. G. 358, 360, 382, 389.
(259) ALETHEIA						
1916		(1916.0)		O. E. 1916		
Nov. 27	15 18. 5	4 19 30. 25	+15 40 47. 2	+6. 2	+45	Ber. A, A. G. 1159, 1160, 1171.
Dec. 1	15 23. 6	4 16 5. 70	+15 40 48. 3	+6. 2	+45	Ber. A, A. G. 1130, 1137, 1148.
(260) HUBERTA						
1915		(1915.0)		E. Z. No. 476		
Feb. 18	17 10. 0	10 4 5. 42	+ 9 4 11. 0	−0. 2	0	Leip. II, A. G. 5366, 5375, 5378.
19	16 39. 1	10 3 25. 87	+ 9 8 53. 2	−0. 2	0	Leip. II, A. G. 5366, 5375, 5378.
(261) PRYMNO						
1920		(1925.0)		O. M. No. 318		
Mar. 27	16 58. 3	11 44 36. 70	+ 8 57 25. 7	0. 0	− 2	Leip. II, A. G. 5928, 5932, 5933.
Apr. 14	14 34. 0	11 32 35. 12	+ 9 48 6. 3	+0. 2	− 2	Leip. II, A. G. 5852, 5857, Leip. I, A. G. 4338, 4360.
(268) ADOREA						
1916		(1916.0)		B. J. 1918		
Oct. 17	16 27. 0	1 15 41. 16	+ 4 24 19. 4	0. 0	0	Alb., A. G. 359, 361, 367.
22	16 16. 6	1 12 4. 64	+ 4 2 45. 9	0. 0	0	Alb., A. G. 342, 347, 352.
1922		(1925.0)		O. E. 1922		
Nov. 21	15 36. 0	3 24 54. 31	+15 24 30. 3	0. 0	− 1	Ber. A, A. G. 928, 931, Leip. I, A. G. 1020, ½ (Leip. I, A. G. 1011+Ber. A, A. G. 921).
23	15 55. 5	3 23 15. 56	+15 19 5. 3	0. 0	− 1	Ber. A, A. G. 916, 928, Leip. I, A. G. 1020, ½ (Leip. I, A. G. 1011+Ber. A, A. G. 921).
(270) ANAHITA						
1915		(1915.0)		B. J. 1917		
Feb. 18	17 10. 0	10 6 53. 41	+ 7 36 1. 1	−0. 4	+ 2	Leip. II, A. G. 5377, 5388, 5393.
19	16 39. 1	10 5 51. 78	+ 7 41 26. 7	−0. 4	+ 2	Leip. II, A. G. 5374, 5377, 5388.
Mar. 9	15 43. 5	9 48 13. 62	+ 9 19 40. 9	−0. 4	+ 2	Leip. I, A. G. 3888, Leip. II, A. G. 5271, 5284.
(275) SAPIENTIA						
1923		(1925.0)		O. E. 1923		
Dec. 12	15 2. 0	4 19 12. 09	+14 45 47. 4	−0. 8	− 2	Ast. Bordeaux +14° 4ʰ 16,ᵐ 33, 35, 39, 42, +15° 4ʰ 20ᵐ, 24.
14	14 44. 0	4 17 25. 82	+14 44 9. 9	−0. 8	− 2	Ast. Bordeaux+14° 4ʰ 16ᵐ, 12, 17, 18, 25, 33, 39.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(276) ADELHEID						
		(1916.0)		B. J. 1918		
1916	h m	h m s	° ′ ″	m	′	
May 31	16 34. 3	16 40 30. 68	− 2 20 30. 4	−0. 5	+ 1	Strasz., A. G. 5730, 5732, 5734.
June 3	15 35. 0	16 38 14. 96	− 2 4 39. 8	−0. 5	+ 1	Strasz., A. G. 5730, 5732, Nicol., A. G. 4192.
		(1918.0)		O. E. 1918		
1918 Nov. 5	16 15. 7	2 2 9. 80	+10 4 7. 2	+0. 6	− 6	Leip. II, A. G. 789, 790, 797.
6	16 28. 2	2 1 28. 23	+ 9 54 14. 0	+0. 6	− 6	Leip. II, A. G. 789, 790, 797.
		(1925.0)		O. E. 1922		
1922 June 23	16 50. 0	19 5 54. 45	+ 6 28 13. 8	+0. 3	+ 5	Leip. II, A. G. 9056, 9066, 9069, 9073.
(277) ELVIRA						
		(1925.0)		O. E. 1919		
1919 Sept. 24	15 35. 8	0 16 33. 76	+ 3 18 32. 7	−3. 8	−24	Alb., A. G. 51, 53, 58.
25	16 0. 4	0 15 46. 05	+ 3 13 7. 8	−3. 8	−24	Alb., A. G. 51, 55, 58.
26	16 0. 0	0 14 59. 29	+ 3 7 45. 0	−3. 8	−24	Alb., A. G. 47, 50, 51, 55, 58.
29	15 52. 0	0 12 38. 93	+ 2 51 31. 9	−3. 8	−24	Alb., A. G. 35, 41, 50.
(279) THULE						
		(1915.0)		B. J. 1917		
1915 Nov. 3	16 52. 0	2 21 4. 58	+12 6 40. 0	−0. 9	− 4	Leip. I, A. G. 693, 708, 709.
5	16 58. 0	2 19 51. 31	+12 1 10. 7	−0. 9	− 4	Leip. I, A. G. 685, 693, 708.
(287) NEPHTHYS						
		(1925.0)		O. E. 1920		
1920 Feb. 10	14 6. 0	7 45 40. 10	+16 26 56. 3	+3. 5	+ 3	Ber. A, A. G. 3045, 3047, 3059, 3064.
13	13 52. 3	7 43 32. 34	+16 48 43. 1	+3. 4	+ 3	Ber. A, A. G. 3026, 3032, 3034, 3035, 3040.
(289) NENETTA						
		(1925.0)		O. E. 1922		
1922 Nov. 10	15 23. 0	2 25 22. 57	+ 6 51 1. 9	+6. 5	+19	Leip. II, A. G. 920, 921, 924, 930.
17	15 43. 0	2 20 37. 16	+ 6 16 4. 4	+6. 3	+19	Leip. II, A. G. 890, 891, 893, 904, 908.
(302) CLARISSA						
		(1925.0)		O. E. 1920		
1920 Nov. 12	15 18. 3	1 29 41. 71	+12 31 51. 4	−1. 7	−10	Leip. I, A. G. 442, 448, 456, 458.
13	14 50. 0	1 29 1. 95	+12 29 8. 4	−1. 8	−10	Leip. I, A. G. 442, 444, 448, 456.
(303) JOSEPHINA						
		(1916.0)		B. J. 1918		
1916 Sept. 25	16 27. 5	0 11 12. 08	+ 4 52 56. 4	−0. 3	− 1	Alb., A. G. 29, 33, 34.
26	16 53. 0	0 10 22. 84	+ 4 49 53. 6	−0. 3	− 1	Alb., A. G. 29, 33, 34.

(305) GORDONIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1916.0)		B. J. 1918		
1916	h m	h m s	° ′ ″	m	′	
Oct. 17	15 3. 5	0 27 38. 90	+ 5 7 30. 5	−3. 5	−20	Alb., A. G. 94, 95, 101.
21	15 5. 8	0 25 1. 74	+ 4 43 58. 7	−3. 5	−20	Alb., A. G. 82, 88, 89.

(306) UNITAS

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Feb. 7	14 41. 5	8 23 39. 54	+16 49 17. 4	−1. 4	+ 4	Ber. A, A. G. 3349, 3350, 3354.
9	14 58. 3	8 21 46. 18	+17 1 10. 3	−1. 4	+ 4	Ber. A, A. G. 3319, 3328, 3348.

(308) POLYXO

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Nov. 27	14 37. 5	3 53 5. 44	+14 23 5. 4	+0. 8	+ 4	Leip. I, A. G. 1149, 1154, 1158.
Dec. 1	14 37. 5	3 49 32. 72	+14 10 45. 7	+0. 8	+ 4	Leip. I, A. G. 1128, 1132, 1135.
1918		(1918.0)		O. E. 1918		
Mar. 5	16 16. 3	10 3 49. 56	+ 8 41 10. 8	−2. 0	+10	Leip. II, A. G. 5373, 5375, 5378.
11	15 16. 1	9 59 30. 80	+ 9 15 6. 7	−2. 0	+10	Leip. II, A. G. 5336, 5347, 5349.
1919		(1925.0)		O. E. 1919		
July 1	15 10. 7	16 33 58. 32	−15 23 2. 9	−0. 8	0	Wash., A. G. 5976, 5982, 5994.
2	14 35. 0	16 33 25. 32	−15 22 59. 3	−0. 8	0	Wash., A. G. 5982, 5988, 5994.

(312) PIERRETTA

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1922		(1925.0)		O. E. 1922		
Mar. 23	16 27. 0	11 24 31. 01	+ 7 25 29. 8	−0. 5	+ 4	Leip. II, A. G. 5809, 5817, 5819, 5822.

(322) PHAEO

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Feb. 7	16 58. 3	9 21 44. 23	+ 4 17 52. 4	0. 1	0	Alb., A. G. 3769, 3776, 3785.

(323) BRUCIA

Date	G. M. T.	α	δ	A. N. 5358 Δα cos δ	A. N. 5358 Δδ	Authority
1923		(1925.0)		m	′	
May 23	16 35. 0	16 19 10. 44	+ 0 47 53. 5	0. 0	+ 1	Nicol., A. G. 4121, 4129, Alb., A. G. 5439, 5445, ½ (Nicol., A. G. 4110+Alb., A. G. 5419).
24	16 50. 0	16 18 5. 37	+ 0 46 15. 2	0. 0	+ 2	Alb., A. G. 5413, ½ (Nicol., A. G. 4107+Alb., A. G. 5417), ½ (Nicol., A. G. 4110+Alb., A. G. 5419), ½ (Nicol., A. G. 4111+Alb., A. G. 5422).
25	17 22. 0	16 16 59. 23	+ 0 44 20. 9	−0. 1	+ 2	Nicol., A. G., 4106, 4109, ½ (Nicol. A. G. 4101+Alb., A. G. 5402), ½ (Nicol., A. G. 4107+Alb., A. G. 5417), ½ (Nicol., A. G. 4110+Alb., A. G. 5419).

(323) BRUCIA—Continued

Date	G. M. T.	Astrographic α	Astrographic δ	O−C Δα cos δ	O−C Δδ	Authority
		(1925.0)		A. N. 5358		
1923	h m	h m s	° ′ ″	m	′	
June 1	16 5. 0	16 9 27. 65	+ 0 26 19. 7	−0. 1	+ 2	Nicol., A. G. 4071, 4072, 4073, 4075, 4079, 4082, 4083, 4085.
4	15 59. 0	16 6 14. 43	+ 0 15 45. 7	0. 0	+ 2	Nicol., A. G. 4054, 4067, 4071, ½ (Nicol., A. G. 4055+Alb., A. G. 5361), ½ (Nicol., A. G. 4060+Alb., A. G. 5368).
9	15 42. 0	16 1 1. 50	− 0 5 29. 2	−0. 1	+ 2	Nicol., A. G. 4040, 4044, 4046, 4047, 4049.
17	15 49. 0	15 53 15. 01	− 0 48 46. 4	0. 0	+ 2	Ast. Alger −0° 15^h 52^m, 89, 94, 104, 116, −2° 15^h 52^m, 17, −1° 15^h 56^m, 76, ½ (−2° 15^h 52^m, 10+ −1° 15^h 48^m, 76).
18	15 16. 0	15 52 22. 21	− 0 54 46. 7	0. 0	+ 2	Ast. Alger −1° 15^h 48^m, 45, −0° 15^h 52^m, 94, 104, −2° 15^h 52^m, 17, ½ (−2° 15^h 52^m, 10+ −1° 15^h 48^m, 76), ⅓ (−2° 15^h 52^m, 2+ −2° 15^h 44^m, 32+ −1° 15^h 48^m, 48).
30	14 18. 0	15 43 8. 37	− 2 19 30. 7	−0. 1	+ 1	Strasz., A. G. 5476, 5478, 5495, Nicol., A. G. 3988, 3997, ½ (Strasz., A. G. 5490+Nicol., A. G. 3993).

(331) ETHERIDGEA

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1915		(1915.0)		B. J. 1917		
Nov. 7	16 32. 8	2 17 40. 09	+16 45 37. 3	−3. 8	−24	Ber. A, A. G. 654, 659, 661.
9	16 40. 7	2 15 56. 56	+16 40 49. 8	−3. 9	−24	Ber. A, A. G. 643, 644, 645.
1923		(1925.0)		O. E. 1923		
Mar. 24	16 27. 0	11 43 1. 45	+ 6 1 19. 1	−0. 9	+ 6	Leip. II, A. G. 5908, 5916, 5917, 5921, 5922, 5926.

(334) CHICAGO

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Oct. 24	15 43. 4	1 53 57. 08	+ 5 19 1. 0	+0. 1	+ 4	Leip. II, A. G. 742, Alb., A. G. 565, 566.
26	16 1. 4	1 52 41. 38	+ 5 11 55. 0	+0. 1	+ 4	Leip. II, A. G. 742, 753, 756.
27	15 11. 4	1 52 5. 52	+ 5 8 30. 5	+0. 1	+ 4	Leip. II, A. G. 709, 717, 742.
Nov. 1	14 43. 9	1 49 2. 16	+ 4 51 59. 6	+0. 2	+ 5	Alb., A. G. 526, 528, 532.
3	14 59. 0	1 47 50. 39	+ 4 45 42. 8	+0. 2	+ 5	Alb., A. G. 522, 526, 528, 532.

(335) ROBERTA

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Dec. 2	17 2. 0	4 42 23. 35	+14 31 45. 1	−3. 6	− 7	Leip. I, A. G. 1374, 1377, Ber. A, A. G. 1296.
22	14 40. 0	4 23 47. 48	+14 15 19. 6	−3. 0	− 8	Leip. I, A. G. 1296, 1305, 1310.
1922		(1925.0)		O. E. 1922		
Mar. 17	15 41. 0	10 57 38. 28	+ 9 34 47. 6	−3. 6	+19	Leip. II, A. G. 5664, 5665, 5666.
22	15 40. 0	10 53 29. 43	+10 7 51. 2	−3. 6	+19	Leip. I, A. G. 4156, 4157, 4161, 4162.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(339) DOROTHEA						
		(1916.0)		B. J. 1918		
1916	h m	h m s	° ′ ″	m	′	
Mar. 11	17 30. 0	11 35 53. 42	+ 2 13 2. 2	−0. 9	+ 7	Alb., A. G. 4320, 4324, 4326.
(340) EDUARDA						
1915		(1915.0)		B. J. 1917		
Nov. 7	16 32. 8	2 18 23. 18	+15 43 1. 3	+0. 7	+ 7	Ber. A, A. G. 657, 658, 667.
9	16 40. 7	2 16 32. 72	+15 38 4. 2	+0. 7	+ 7	Ber. A, A. G. 644, 651, 653.
(341) CALIFORNIA						
1915		(1915.0)		B. J. 1917		
Nov. 7	16 32. 8	2 30 44. 84	+17 35 35. 2	+1. 2	+10	Ber. A, A. G. 704, 706, 709.
9	16 40. 7	2 28 24. 86	+17 31 34. 5	+1. 2	+10	Ber. A, A. G. 691, 696, 704.
(342) ENDYMION						
1918		(1918.0)		O. E. 1917		
Jan. 10	14 26. 7	5 4 34. 70	+15 21 25. 8	−2. 6	+ 6	Ber. A, A. G. 1405, 1411, 1416.
15	14 1. 6	5 2 31. 27	+15 14 46. 6	---	--	Ber. A, A. G. 1388, 1398, 1402, 1405.
(344) DESIDERATA						
1917		(1917.0)		O. E. 1917		
Nov. 6	14 50. 7	2 13 25. 20	+ 6 55 35. 2	+0. 5	+ 8	Leip. II, A. G. 847, 851, 862.
6	15 58. 7	2 13 21. 95	+ 6 55 35. 6	+0. 5	+ 8	Leip. II, A. G. 847, 856, 864.
8	14 32. 3	2 11 13. 80	+ 6 58 52. 2	+0. 5	+ 8	Leip. II, A. G. 842, 847, 851.
(345) TERCIDINA						
1920		(1925.0)		O. E. 1920		
Sept. 13	16 24. 0	23 9 35. 57	+ 6 58 4. 6	−3. 6	−22	Leip. II, A. G. 11554, 11565, 11571, 11573.
14	16 25. 2	23 8 44. 63	+ 6 48 31. 3	−3. 6	−22	Leip. II, A. G. 11554, 11560, 11565, 11571.
(352) GISELA						
1916		(1916.0)		B. J. 1918		
Mar. 10	15 27. 4	10 11 53. 57	+ 5 5 5. 5	−1. 9	+11	Leip. II, A. G. 5405, 5408, 5422.
23	14 27. 0	10 2 28. 60	+ 6 17 27. 5	−1. 7	+ 9	Leip. II, A. G. 5364, 5367, 5368.
(357) NININA						
1922		(1925.0)		O. E. 1922		
May 15	15 17. 0	14 47 45. 36	+ 5 45 38. 8	+0. 2	− 7	Leip. II, A. G. 6815, 6816, 6817, 6825.
19	15 14. 0	14 45 2. 39	+ 5 51 13. 2	+0. 2	− 7	Leip. II, A. G. 6809, 6812, 6816, 6817.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(358) APOLLONIA				
		(1917.0)		O. E. 1917		
1917	h m	h m s	° ′ ″	m	′	
Jan. 16	16 10. 8	8 18 7. 55	+15 4 59. 6	+4. 2	−10	Ber. A, A. G. 3301, 3304, 3307.
19	16 1. 4	8 15 25. 98	+15 16 16. 2	+4. 2	−10	Ber. A, A. G. 3275, 3280, 3294.
		(361) BONONIA				
1914		(1914.0)		B. J. 1916		
Oct. 22	16 35. 0	2 35 49. 94	+21 48 31. 1	−0. 7	+ 3	Ber. B, A. G. 798, 807.
		(363) PADUA				
1916		(1916.0)		B. J. 1918		
Mar. 30	15 57. 0	12 7 36. 58	+ 7 51 33. 5	+1. 0	− 8	Leip. II, A. G. 6037, 6045, 6048.
Apr. 9	15 17. 0	11 59 48. 68	+ 8 23 22. 2	+1. 0	− 8	Leip. II, A. G. 5998, 6000, 6010.
12	15 24. 0	11 57 42. 06	+ 8 30 9. 0	+1. 0	− 8	Leip. II, A. G. 5993, 5998, 6000.
		(364) ISARA				
1923		(1925.0)		O. E. 1923		
Apr. 21	15 44. 0	13 26 36. 91	+ 1 31 0. 2	−2. 4	+14	Alb., A. G. 4734, 4736, 4741, 4743, 4747.
		(367) AMICITIA				
1914		(1914.0)		B. J. 1916		
Oct. 19	16 42. 2	2 12 25. 98	+ 8 54 19. 4	−0. 2	− 1	Leip. II, A. G. 849, 863.
21	16 40. 0	2 10 23. 05	+ 8 44 51. 4	−0. 2	− 1	Leip. II, A. G. 834, 849.
		(368) HAIDEA				
1921		(1925.0)		B. Z. No. 33		
Oct. 22	14 34. 0	1 7 36. 55	+12 49 25. 1	−0. 1	− 3	Leip. I, A. G. 312, 327, 331, 332.
24	15 13. 0	1 6 13. 68	+12 33 53. 7	−0. 1	− 3	Leip. I, A. G. 311, 312, 317, 332.
26	14 45. 0	1 4 55. 82	+12 18 52. 9	0. 0	− 4	Leip. I, A. G. 309, 310, 311, 315.
Nov. 4	14 31. 0	0 59 48. 36	+11 13 35. 6	0. 0	− 4	Leip. I, A. G. 271, 272, 282, 285.
		(371) BOHEMIA				
1916		(1916.0)		B. J. 1918		
Sept. 19	16 28. 5	23 14 7. 07	+ 6 57 2. 2	−4. 5	−34	Leip. II, A. G. 11583, 11596, 11601.
20	15 23. 0	23 13 20. 40	+ 6 52 19. 0	−4. 5	−34	Leip. II, A. G. 11583, 11596, 11601.
		(374) BURGUNDIA				
1916		(1916.0)		B. J. 1918		
Sept. 19	15 36. 5	23 3 34. 84	+ 5 5 52. 3	−0. 7	− 4	Alb., A. G. 7970, 7972, 7987.
20	14 32. 5	23 2 54. 04	+ 4 58 39. 6	−0. 7	− 4	Alb., A. G. 7970, 7972, 7987.
1921		(1925.0)		O. E. 1921		
Oct. 22	14 34. 0	1 14 12. 22	+11 46 7. 8	−0. 6	− 6	Leip. I, A. G. 353, 354, 363.
24	15 13. 0	1 12 41. 36	+11 30 48. 3	−0. 6	− 6	Leip. I, A. G. 349, 353, 354.
26	14 45. 0	1 11 14. 41	+11 15 52. 6	−0. 6	− 6	Leip. I, A. G. 334, 342, 349.
Nov. 4	14 31. 0	1 5 18. 54	+10 10 39. 3	−0. 6	− 6	Leip. I, A. G. 306, 308, 314, Leip. II, A. G. 411.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(375) URSULA						
		(1918.0)		O. E. 1918		
1918	h m	h m s	° ′ ″	m	′	
Mar. 2	14 41. 8	9 52 36. 22	+16 3 18. 9	−0. 2	−10	Ber. A, A. G. 3989, 3992, 3995.
5	14 25. 8	9 50 10. 32	+16 4 29. 4	−0. 2	−10	Ber. A, A. G. 3972, 3975, 3979.
(376) GEOMETRIA						
1916		(1916.0)		B. J. 1918		
Mar. 4	13 47. 8	8 44 19. 17	+14 54 2. 8	−0. 2	− 1	Leip. I, A. G. 3540, 3552, Ber. A, A. G. 3525.
(377) CAMPANIA						
1915		(1915.0)		B. J. 1917		
Oct. 9	15 54. 0	0 29 48. 03	+ 6 59 57. 5	−15. 0	−75	Leip. II, A. G. 171, 180, 185.
10	15 5. 0	0 29 4. 34	+ 6 52 5. 2	−15. 0	−75	Leip. II, A. G. 157, 166, 171.
11	13 15. 3	0 28 22. 95	+ 6 44 35. 6	−15. 0	−74	Leip. II, A. G. 157, 162, 166.
25	13 9. 1	0 19 17. 68	+ 4 56 47. 2	−14. 1	−72	Alb., A. G. 62, 70, 71.
27	13 20. 5	0 18 16. 27	+ 4 42 53. 3	−14. 0	−71	Alb., A. G. 62, 70, 71.
Nov. 1	14 27. 0	0 16 5. 44	+ 4 10 30. 3	−13. 7	−69	Alb., A. G. 54, 56, 62.
5	13 14. 0	0 14 48. 57	+ 3 47 59. 8	----	--	Alb., A. G. 39, 49, 53.
(378) HOLMIA						
1916		(1916.0)		B. J. 1918		
Nov. 18	14 37. 1	3 5 32. 48	+17 40 20. 0	+3. 5	+ 4	Ber. A, A. G. 838, 840, 844.
25	14 45. 8	2 59 59. 99	+16 52 32. 5	+3. 5	+ 4	Ber. A, A. G. 815, 821, 825.
(379) HUENNA						
1919		(1925.0)		O. E. 1919		
July 25	15 36. 9	19 22 3. 29	−19 54 37. 9	−7. 1	−13	Alger Cat. (1900), 8281, 8284, 8291, 8299, 8312, 8314, 8322.
30	15 43. 6	19 18 14. 67	−20 4 51. 4	−7. 0	−13	Alger Cat. (1900), 8228, 8235, 8257, 8268, 8278, 8281, 8284.
Aug. 2	15 1. 0	19 16 8. 80	−20 10 38. 1	−7. 0	−13	Alger Cat. (1900), 8215, 8228, 8230, 8235, 8247, 8252, 8257.
(380) FIDUCIA						
1917		(1917.0)		O. E. 1917		
Apr. 13	16 12. 3	13 29 51. 41	+ 0 23 21. 9	−4. 1	+26	Nicol., A. G. 3599, 3611, 3612.
May 10	14 49. 5	13 9 21. 26	+ 1 40 34. 9	−3. 8	+23	Alb., A. G. 4666, 4668, 4670.
(382) DODONA						
1914		(1914.0)		B. J. 1916		
Nov. 19	16 47. 1	4 1 48. 61	+30 37 59. 0	−0. 6	− 1	Leid., A. G. 1529, 1554.
(384) BURDIGALA						
1914		(1914.0)		B. J. 1916		
Nov. 17	16 47. 0	3 8 6. 00	+18 17 53. 5	−6. 0	−29	Ber. A, A. G. 854, 863.

(385) ILMATAR

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1918.0)		O. E. 1918		
1918 Mar. 11	h m 15 58. 6	h m s 11 2 34. 11	° ′ ″ + 5 30 17. 5	m −7. 6	′ +75	Leip. II, A. G. 5682, 5686, 5695.
		(1925.0)		O. E. 1920		
1920 Sept. 15	16 29. 0	23 43 33. 14	+ 2 4 11. 9	−0. 8	− 2	Alb., A. G. 8157, 8158, 8162, 8164.

(387) AQUITANIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1915.0)		B. J. 1918		
1915 Dec. 31	17 12. 1	7 3 13. 50	+11 46 27. 2	+0. 9	+10	Leip. I, A. G. 2716, 2719, 2722.
		(1916.0)				
1916 Jan. 2	16 0. 0	7 1 31. 24	+11 54 50. 8	+1. 0	+10	Leip. I, A. G. 2687, 2698, 2709.

(388) CHARYBDIS

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1912.0)		B. J. 1914		
1912 Oct. 1	15 11. 5	0 41 51. 86	+ 7 25 38. 2	−3. 0	−25	Leip. II, A. G. 250, 257.
4	15 12. 5	0 39 21. 42	+ 7 16 20. 0	−3. 0	−25	Leip. II, A. G. 237, 239, 250.
7	14 53. 0	0 36 52. 06	+ 7 6 53. 2	−3. 0	−25	Leip. II, A. G. 216, 237, 239.

(393) LAMPETIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1917.0)		O. E. 1917		
1917 Oct. 16	16 24. 8	1 54 26. 83	+14 42 10. 6	+1. 9	0	Leip. I, A. G. 590, 592, 594.
17	15 54. 9	1 53 36. 76	+14 30 37. 4	+1. 9	0	Leip. I, A. G. 584, 587, 590.

(401) OTTILIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1916.0)		B. J. 1918		
1916 Oct. 17	16 27. 0	1 16 44. 40	+ 5 16 28. 4	+0. 3	+ 3	Leip. II, A. G. 470, Alb., A. G. 367, 371.
22	16 16. 6	1 13 5. 75	+ 5 1 59. 2	+0. 3	+ 3	Alb., A. G. 342, 347, 353.

(402) CHLOË

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1925.0)		O. E. 1918		
1919 Jan. 6	15 18. 0	5 39 57. 92	+11 40 26. 9	+0. 3	+ 9	Leip. I, A. G. 1771, 1778, 1780.
7	14 59. 9	5 39 7. 65	+11 46 40. 5	+0. 3	+ 9	Leip. I, A. G. 1754, 1771, 1780.

(403) CYANE

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1915.0)		B. J. 1917		
1915 Sept. 12	14 55. 0	22 0 15. 62	+ 2 0 0. 0	−1. 2	−10	Alb., A. G. 7673, 7680, 7688.

(407) ARACHNE

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1916.0)		B. J. 1918		
1916 Sept. 19	16 28. 5	23 20 19. 87	+ 7 43 56. 0	−1. 1	− 7	Leip. II, A. G. 11625, 11628, 11633.
20	15 23. 0	23 19 29. 84	+ 7 39 52. 7	−1. 1	− 7	Leip. II, A. G. 11625, 11628, 11633.

(409) ASPASIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1916.0)		B. J. 1918		
1916	h m	h m s	° ′ ″	m	′	
Dec. 29	16 6. 5	6 41 53. 14	+12 18 29. 0	+0. 9	−12	Leip. I, A. G. 2458, 2461, 2485.
30	16 18. 1	6 40 51. 52	+12 16 10. 0	+0. 9	−12	Leip. I, A. G. 2458, 2461, 2485.

(413) EDBURGA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1923		(1925.0)		O. E. 1923		
May 23	16 35. 0	16 15 44. 60	− 0 18 48. 7	−1. 9	−13	Nicol., A. G. 4098, 4103, 4104, 4105, 4106.
24	16 50. 0	16 14 41. 19	− 0 19 35. 2	−1. 9	−13	Nicol., A. G. 4098, 4100, 4103, 4104, 4106.
25	17 22. 0	16 13 36. 60	− 0 20 34. 5	−1. 9	−13	Nicol., A. G. 4088, 4092, 4098, 4100, 4103, 4104.
June 1	16 5. 0	16 6 12. 98	− 0 32 57. 1	−1. 9	−13	Nicol., A. G. 4054, 4056, 4059, 4066, 4067, 4069, 4070.
4	15 59. 0	16 3 2. 20	− 0 41 19. 4	−1. 9	−13	Nicol., A. G. 4045, 4047, 4051, 4054, 4056.
9	15 42. 0	15 57 52. 65	− 0 59 30. 6	−1. 8	−13	Nicol., A. G. 4031, 4037, 4038, 4040, 4041, 4045.
17	15 49. 0	15 50 11. 84	− 1 39 16. 0	−1. 7	−13	Ast. Alger −2° 15^h 44^m, 26, ½ (−2° 15^h 44^m, 30+ −1° 15^h 48^m, 147), ⅓ (−2° 15^h 44^m, 32+ −1° 15^h 48^m, 48+ −2° 15^h 52^m, 2), ½ (−2° 15^h 52^m, 4+ −1° 15^h 48^m, 152), −2° 15^h 52^m, 9, ½ (−2° 15^h 52^m, 10+ −1° 15^h 48^m, 76), −2° 15^h 52^m, 11.
18	15 16. 0	15 49 19. 89	− 1 44 58. 2	−1. 7	−13	Ast. Alger −2° 15^h 44^m, 26, ½ (−2° 15^h 44^m, 30+ −1° 15^h 48^m, 147), ⅓ (−2° 15^h 44^m, 32+ −1° 15^h 48^m, 48+ −2° 15^h 52^m, 2), ½ (−2° 15^h 52^m, 4+ −1° 15^h 48^m, 152), −2° 15^h 52^m, 9, ½ (−2° 15^h 52^m, 10+ −1° 15^h 48^m, 76), −2° 15^h 52^m, 11.
30	14 18. 0	15 40 25. 15	− 3 8 22. 2	−1. 4	−11	Strasz., A. G. 5473, 5478, 5479, 5484.

(415) PALATIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1919		(1925.0)		O. E. 1918		
Jan. 6	16 11. 0	6 3 28. 90	+15 43 42. 9	+2. 6	+12	Ber. A, A. G. 1919, 1927, 1934.
7	15 45. 9	6 2 45. 86	+15 50 41. 6	+2. 6	+12	Ber. A, A. G. 1906, 1911, 1919.

(416) VATICANA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1921		(1925.0)		O. E. 1921		
Nov. 29	14 18. 0	3 5 28. 94	+15 52 46. 7	−2. 2	−11	Ber. A, A. G. 835, 839, 841, 842.
Dec. 3	14 23. 0	3 2 13. 72	+15 51 9. 4	−2. 2	−11	Ber. A, A. G. 820, 829, 830.

(418) ALEMANNIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1923		(1925.0)		O. E. 1923		
Jan. 19	16 3. 0	7 50 42. 16	+12 42 5. 4	−0. 6	+ 4	Leip. I, A. G. 3139, 3140, 3150, 3152, 3164.
22	15 10. 0	7 47 45. 57	+12 46 14. 3	−0. 5	+ 3	Leip. I, A. G. 3112, 3116, 3132, 3139, 3140.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(419) AURELIA						
		(1917.0)		O. E. 1917		
1917	h m	h m s	° ′ ″	m	′	
Sept. 19	16 59. 2	0 26 25. 49	+ 8 2 38. 8	−0. 2	− 1	Leip. II, A. G. 139, 141, 150.
22	16 22. 0	0 23 48. 48	+ 7 42 29. 6	−0. 1	− 1	Leip. II, A. G. 129, 139, 141.
(420) BERTHOLDA						
1915		(1915.0)		B. J. 1917		
Sept. 8	17 32. 0	23 11 25. 48	+ 4 34 59. 9	−1. 0	−10	Alb., A. G. 8019, 8028, 8030.
12	16 22. 0	23 8 46. 77	+ 4 17 7. 9	−1. 0	−10	Alb., A. G. 8004, 8005, 8019.
13	16 34. 5	23 8 6. 32	+ 4 12 23. 8	−1. 0	−10	Alb., A. G. 8004, 8005, 8011.
(425) CORNELIA						
1915		(1915.0)		B. J. 1917		
Nov. 9	17 54. 1	3 16 27. 38	+16 52 39. 9	−1. 1	− 3	Ber. A, A. G. 893, 895, 901.
10	17 6. 0	3 15 35. 56	+16 50 24. 0	−1. 1	− 3	Ber. A, A. G. 888, 893, 901.
(429) LOTIS						
1918		(1918.0)		O. E. 1918		
Nov. 27	14 19. 8	2 36 11. 28	+12 12 25. 3	+2. 2	+ 5	Leip. I, A. G. 776, 783, 788.
30	14 27. 1	2 34 33. 04	+11 51 49. 4	+2. 2	+ 5	Leip. I, A. G. 764, 766, 783.
(433) EROS						
1921		(1925.0)		B. Z. 1921 Nos. 27, 34		
Nov. 21	11 26. 0	22 22 7. 04	+ 9 13 41. 5	0. 0	+2. 3	Leip. II, A. G. 11252, 11258, 11265, 11266.
22	11 24. 0	22 23 29. 46	+ 9 14 42. 1	0. 0	+2. 4	Leip. II, A. G. 11266, 11272, 11278, 11280.
25	11 16. 0	22 27 48. 35	+ 9 18 55. 5	0. 0	+2. 7	Leip. II, A. G. 11288, 11292, 11297, 11309.
Dec. 3	11 12. 0	22 40 49. 08	+ 9 39 59. 4	0. 0	+1. 9	Leip. II, A. G. 11362, 11375, Leip. I, A. G. 9070.
(440) THEODORA						
1916		(1916.0)		B. J. 1918		
Feb. 7	15 40. 8	8 43 23. 64	+16 59 43. 6	+2. 6	−12	Ber. A, A. G. 3518, 3524, 3532.
(441) BATHILDE						
1916		(1916.0)		B. J. 1918		
Sept. 19	14 45. 5	22 41 48. 03	+ 5 4 39. 6	+6. 1	+38	Leip. II, A. G. 11379, Alb., A. G. 7874, 7876.
20	13 36. 0	22 41 7. 36	+ 4 58 58. 8	+6. 1	+38	Leip. II, A. G. 11371, 11379, Alb., A. G. 7876.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(442) EICHSFELDIA						
		(1917.0)		O. E. 1917		
1917	h m	h m s	° ′ ″	m	′	
Feb. 24	15 5. 8	10 14 37. 80	+14 28 40. 6	+0. 1	+ 2	Leip. I, A. G. 3988, Ber. A, A. G. 4110, 4114.
Mar. 12	14 16. 0	10 1 3. 81	+16 26 27. 8	+0. 1	+ 2	Ber. A, A. G. 4031, 4032, 4044.
(446) AETERNITAS						
1916		(1916.0)		B. J. 1918		
Mar. 31	17 19. 5	13 8 12. 98	+ 1 10 38. 2	+4. 4	−44	Alb., A. G. 4662, 4670, Nicol., A. G. 3553.
Apr. 10	17 9. 5	12 59 16. 29	+ 1 37 21. 2	+4. 4	−44	Alb., A. G. 4630, 4633, 4635.
(447) VALENTINE						
1917		(1917.0)		O. E. 1917		
Mar. 19	14 43. 7	10 52 37. 21	+14 41 40. 0	0. 1	+ 1	Leip. I, A. G. 4154, Ber. A, A. G. 4310, 4318.
22	14 32. 4	10 50 31. 80	+14 50 46. 6	−0. 1	+ 1	Leip. I, A. G. 4154, Ber. A, A. G. 4286, 4295.
(451) PATIENTIA						
1915		(1915.0)		B. J. 1917		
Nov. 27	15 42. 0	4 11 24. 79	+10 29 27. 5	−7. 4	−38	Leip. I, A. G. 1245, 1246, 1251.
30	15 19. 0	4 8 37. 52	+10 36 30. 4	−7. 4	−38	Leip. I, A. G. 1235, 1245, 1246.
(455) BRUCHSALIA						
1917		(1917.0)		O. E. 1917		
May 12	15 14. 7	13 54 26. 71	+ 1 1 42. 9	+0. 8	− 7	Alb., A. G. 4821, 4824, Nicol., A. G. 3668.
14	15 0. 7	13 52 50. 52	+ 1 2 21. 1	+0. 8	− 7	Alb., A. G. 4821, 4824, Nicol., A. G. 3659.
(465) ALEKTO						
1923		(1925.0)		O. E. 1923		
Feb. 19	15 51. 0	9 18 20. 87	+13 19 55. 5	−0. 8	+ 5	Leip. I, A. G. 3712, 3713, 3719, 3733, 3736.
21	15 51. 0	9 16 40. 26	+13 25 2. 8	−0. 8	+ 5	Leip. I, A. G. 3710, 3712, 3713, 3719, 3724.
(466) TISIPHONE						
1913		(1913.0)		B. J. 1914		
Jan. 1	15 8. 1	6 35 22. 18	+29 19 44. 0	−4. 9	+ 8	Camb. Eng., A. G. 3400, 3406, 3426.
4	16 19. 9	6 32 26. 54	+29 8 25. 8	−4. 9	+ 8	Camb. Eng., A. G. 3365, 3400, 3406.
15	13 52. 0	6 22 35. 86	+28 23 22. 6	−4. 7	+ 7	Camb. Eng., A. G. 3233, 3246, 3248.

(468) LINA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1925.0)		O. E. 1921		
1921	h m	h m s	° ′ ″	m	′	
Oct. 28	15 54. 0	1 26 36. 90	+ 9 11 44. 4	−0. 6	− 4	Leip. II, A. G. 548, 554, 566, 567.
Nov. 7	14 21. 0	1 20 10. 64	+ 8 35 30. 5	−0. 6	− 4	Leip. II, A. G. 492, 495, 504, 519.

(469) ARGENTINA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1915		(1915.0)		B. J. 1917		
Sept. 15	16 40. 2	23 44 28. 12	+ 4 49 43. 8	−1. 4	−13	Alb., A. G. 8156, 8166, 8169.
16	16 45. 0	23 43 42. 34	+ 4 47 6. 8	−1. 4	−13	Alb., A. G. 8156, 8166, 8169.

(471) PAPAGENA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1922		(1925.0)		O. E. 1922		
Dec. 12	15 50. 0	4 21 5. 61	+15 45 28. 2	−1. 4	− 3	Ber. A, A. G. 1159, 1160, 1171, 1174.

(479) CAPRERA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Feb. 7	15 40. 8	8 52 27. 70	+16 46 16. 7	+5. 4	−10	Ber. A, A. G. 3602, 3604, 3607.

(483) SEPPINA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1917		(1917.0)		O. E. 1917		
Aug. 18	16 2. 6	22 14 45. 62	+ 0 36 30. 5	+8. 3	+ 2	Nicol., A. G. 5618, 5627, 5628.
20	18 5. 5	22 13 28. 00	+ 0 20 19. 9	+8. 3	+ 2	Nicol., A. G. 5606, 5611, 5618.
1922		(1925.0)		O. E. 1922		
May 24	16 14. 0	15 29 59. 19	+ 4 5 38. 3	+1. 1	− 3	Alb., A. G. 5232, 5234, 5235, 5236.
29	15 25. 5	15 26 48. 24	+ 4 19 15. 0	+1. 0	− 3	Alb., A. G. 5226, 5227, 5231, Leip. II, A. G. 6997.

(485) GENUA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1917		(1917.0)		O. E. 1917		
Aug. 10	16 22. 0	21 2 12. 42	+ 0 45 35. 6	+2. 8	+ 5	Nicol., A. G. 5363, 5365, 5369.
13	16 15. 7	20 59 50. 94	+ 0 28 34. 4	+2. 8	+ 5	Nicol., A. G. 5346, 5355, 5358.
15	17 30. 2	20 58 14. 92	+ 0 16 21. 4	+2. 8	+ 5	Nicol., A. G. 5341, 5345, 5346.
1922		(1925.0)		O. E. 1922		
Sept. 23	15 52. 0	23 17 34. 44	+ 3 21 45. 0	−1. 3	− 4	Alb., A. G. 8054, 8059, 8061, 8063.
25	15 29. 0	23 16 8. 88	+ 3 2 34. 0	−1. 3	− 4	Alb., A. G. 8042, 8046, 8049, 8054.

(487) VENETIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1919		(1925.0)		O. E. 1919		
June 28	15 33. 0	16 46 39. 62	−13 29 27. 2	+ 1. 0	− 6	Camb. U. S., A. G. 5781, 5785, 5787, 5788.
29	14 59. 1	16 45 54. 71	−13 32 14. 1	+ 1. 0	− 6	Camb. U. S., A. G. 5774, 5781, 5785.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
			(489) COMACINA			
		(1917.0)		O. E. 1917		
1917	h m	h m s	° ′ ″	m	′	
Apr. 13	16 12. 3	13 28 21. 44	+ 2 17 5. 6	+ 0. 9	+ 4	Alb., A. G. 4743, 4745, 4746.
May 11	15 3. 0	13 12 7. 68	+ 4 44 12. 1	+ 0. 9	+ 3	Leip. II, A. G. 6352, 6357, Alb., A. G. 4674.
		(1925.0)		O. E. 1923		
1923 May 22	16 18. 0	15 43 12. 51	− 1 26 55. 2	− 0 4	+ 2	Nicol., A. G. 3985, 3991, 3996, 3997, 4000, 4001.
23	15 31. 0	15 42 30. 16	− 1 23 55. 9	− 0. 4	+ 2	Nicol., A. G. 3985, 3986, 3988, 3989, 3992, 3997.
			(490) VERITAS			
		(1916.0)		B. J. 1918		
1916 Mar. 4	15 35. 8	8 50 42. 52	+ 9 42 43. 6	− 6. 4	+20	Leip. I, A. G. 3582, Leip. II, A. G. 4869, 4880.
			(494) VIRTUS			
		(1915.0)		B. J. 1917		
1915 Mar. 13	16 11. 0	10 55 22. 49	+16 23 40. 2	− 1. 9	+12	Ber. A, A. G. 4317, 4322, 4331.
17	14 27. 0	10 52 12. 84	+16 33 45. 5	− 1. 9	+12	Ber. A, A. G. 4301, 4313, 4317.
			(497) IVA			
		(1913.0)		A. N. 4622		
1913 Jan. 1	15 8. 1	6 43 32. 68	+30 55 55. 9	+15. 2	−14	Leid., A. G. 2818, 2859.
			(498) TOKIO			
		(1915.0)		E. Z. No. 496		
1915 Nov. 27	15 42. 0	4 21 15. 74	+12 53 51. 8	− 2. 4	− 4	Leip. I, A. G. 1284, 1287, 1292.
30	15 19. 0	4 18 7. 30	+12 57 36. 1	− 2. 4	− 4	Leip. I, A. G. 1275, 1284, 1287.
Dec. 10	13 53. 0	4 8 10. 04	+13 15 17. 6	− 2. 2	− 4	Leip. I, A. G. 1225, 1229, 1241.
			(503) EVELYN			
		(1915.0)		B. J. 1917		
1915 Nov. 9	17 54. 1	3 20 6. 60	+15 25 46. 3	+ 4. 0	+25	Ber. A, A. G. 903, 916, Leip. I, A. G. 1001.
10	17 6. 0	3 19 10. 62	+15 24 18. 5	+ 4. 0	+25	Ber. A, A. G. 903, 904, 916.
			(518) HALAWE			
		(1915.0)				
1915 Oct. 9	16 45. 2	0 50 42. 25	+ 7 33 17. 9	---	--	Leip. II, A. G. 308, 309, 315, 322.
12	14 21. 8	0 48 29. 62	+ 7 4 51. 7	---	--	Leip. II, A. G. 298, 300, 306.
		(1925.0)		O. E. 1923		
1923 Oct. 3	15 38. 0	23 38 23. 79	+ 2 45 48. 1	−0. 1	− 8	Alb., A. G. 8133, 8136, 8137, 8139, 8143, 8145, 8146.
6	15 42. 6	23 36 46. 04	+ 2 17 22. 9	−0. 1	− 8	Alb., A. G. 8125, 8128, 8130, 8133, 8137, 8143.

(519) SYLVANIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1917.0)		O. E. 1917		
1917	h m	h m s	° ′ ″	m	′	
Nov. 7	15 16. 2	2 27 25. 68	+13 12 8. 0	−1. 5	−10	Leip. I, A. G. 731, 735, 740.
8	15 22. 8	2 26 25. 22	+13 12 49. 6	−1. 5	−10	Leip. I, A. G. 730, 731, 735.

(526) JENA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1920		(1925.0)		O. E. 1920		
Feb. 16	15 17. 0	8 55 53. 40	+17 17 19. 8	+8. 9	−30	Ber. A, A. G. 3608, 3620, 3635.
17	14 21. 1	8 55 10. 94	+17 21 6. 4	+8. 9	−30	Ber. A, A. G. 3608, 3620, 3628.

(530) TURANDOT

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1915		(1915.0)		B. J. 1917		
Mar. 14	17 48. 0	11 33 11. 93	+11 3 38. 3	−2. 2	+12	Leip. I, A. G. 4347, 4348, 4355.
17	15 51. 0	11 31 11. 08	+11 19 38. 2	−2. 2	+12	Leip. I, A. G. 4330, 4339, 4347.

(532) HERCULINA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Dec. 22	15 28. 0	5 28 29. 50	+13 17 7. 4	−6. 7	−16	Leip. I, A. G. 1697, 1699, 1700.
28	15 57. 4	5 22 33. 84	+13 47 31. 4	−6. 6	−17	Leip. I, A. G. 1629, 1630, 1636.
29	14 4. 5	5 21 41. 42	+13 52 24. 0	−6. 6	−18	Leip. I, A. G. 1629, 1630, 1640.

(535) MONTAGUE

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1922		(1925.0)		O. E. 1922		
Nov. 10	15 23. 0	2 18 54. 86	+ 5 41 22. 2	+0. 1	+ 2	Leip. II, A. G. 884, 885, 888, 889, ½ (Alb., A. G. 661+Leip. II, A. G. 877).
17	15 43. 0	2 12 53. 20	+ 5 32 19. 0	0. 0	+ 3	Leip. II, A. G. 843, 850, 859, ½ (Alb., A. G. 634+Leip. II, A. G. 845), ½ (Alb., A. G. 647+Leip. II, A. G. 853).

(536) MERAPI

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1915		(1915.0)		B. J. 1917		
Jan. 8	15 38. 7	9 18 46. 16	+40 5 52. 2	---	--	Bonn, A. G. 7081, 7087, 7094.
10	16 3. 9	9 17 23. 98	+40 20 3. 4	---	--	Bonn, A. G. 7078, 7081, 7087.
Feb. 8	14 3. 1	8 52 36. 12	+42 42 34. 8	+9. 7	− 2	Bonn, A. G. 6860, 6878, 6880.
10	13 14. 0	8 50 52. 38	+42 46 44. 6	+9. 7	− 1	Bonn, A. G. 6835, 6848, 6860.
17	13 39. 0	8 44 56. 96	+42 55 26. 2	+9. 6	− 1	Bonn, A. G. 6788, 6800, 6808.
1916		(1916.0)		B. J. 1918		
Apr. 9	16 7. 5	12 33 26. 48	+19 48 32. 8	+7. 7	−80	Ber. A, A. G. 4716, Ber. B, A. G. 4561, 4565.
10	14 49. 2	12 32 45. 98	+19 48 49. 2	+7. 7	−80	Ber. A, A. G. 4716, Ber. B, A. G. 4561, 4565.
1917		(1917.0)		O. E. 1917		
May 1	16 54. 8	15 45 54. 95	−16 26 59. 2	+5. 9	−76	Wash., A. G. 5782, 5788, 5790.
11	16 25. 6	15 38 5. 40	−16 36 21. 2	+5. 9	−77	Wash., A. G. 5741, 5745, 5753.
14	16 17. 7	15 35 38. 02	−16 39 4. 1	+5. 9	−77	Wash., A. G. 5733, 5739, 5741.
23	16 29. 0	15 28 11. 44	−16 47 35. 0	+5. 8	−77	Wash., A. G. 5693, 5700, 5703.
25	16 10. 5	15 26 34. 23	−16 49 32. 1	+5. 8	−77	Wash., A. G. 5686, 5693, 5700.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(536) MERAPI—Continued						
		(1925.0)		O. M. No. 206		
1919	h m	h m s	° ′ ″	m	′	
Sept. 27	17 27. 8	2 6 53. 78	− 6 42 18. 6	−0. 6	+ 6	Wien-Ottak., A. G. 458, 459, 468.
29	17 5. 0	2 5 35. 94	− 6 46 24. 9	−0. 6	+ 6	Wien-Ottak., A. G. 453, 458, 468.
Oct. 27	15 8. 6	1 43 17. 67	− 7 4 5. 9	−0. 6	+ 8	Wien-Ottak., A. G. 366, 370, 374.
		(1925.0)		O. E. 1920		
1921 Jan. 3	14 0. 7	6 5 36. 55	+38 50 25. 8	+8. 2	+50	Lund, A. G. 3133, 3134, 3146, 3148.
		(1925.0)		O. E. 1922		
1922 Feb. 28	16 25. 0	10 59 42. 62	+34 41 24. 8	−1. 1	+ 5	Lund, A. G. 5089, 5107, ½ (Lund, A. G. 5109+Leid., A. G. 4350).
Mar. 17	14 17. 0	10 46 23. 55	+35 10 37. 4	−1. 0	+ 5	Lund, A. G. 5045, 5050, 5053, 5056.
22	14 15. 0	10 42 52. 88	+35 8 19. 1	−1. 1	+ 5	Lund, A. G. 5033, 5035, 5039, 5045.
		(1925.0)		O. E. 1923		
1923 Apr. 20	16 31. 0	14 1 18. 14	+ 3 11 17. 1	−0. 8	+ 8	Alb., A. G. 4863, 4865, 4869, 4872, 4882.
May 19	14 52. 0	13 41 17. 85	+ 2 57 46. 5	−0. 7	+ 7	Alb., A. G. 4779, 4783, 4785, 4792, 4793, 4794.
22	14 52. 0	13 39 42. 12	+ 2 50 50. 8	−0. 7	+ 7	Alb., A. G. 4776, 4777, 4779, 4783, 4785.
(538) FRIEDERIKE						
		(1916.0)		B. J. 1918		
1916 Nov. 1	17 14. 4	3 9 29. 51	+ 7 11 26. 6	+23. 4	+107	Leip. II, A. G. 1191, 1196, 1203.
2	16 44. 0	3 8 43. 58	+ 7 7 29. 2	+23. 4	+107	Leip. II, A. G. 1191, 1196, 1203.
(540) ROSAMUNDE						
		(1918.0)		O. E. 1918		
1918 Nov. 27	15 21. 9	3 23 35. 62	+12 49 10. 9	+0. 7	− 1	Leip. I, A. G. 1012, 1013, 1014.
30	15 22. 7	3 20 39. 12	+12 33 22. 8	+0. 7	− 1	Leip. I, A. G. 1003, 1005, 1008.
		(1925.0)		O. E. 1921		
1921 Oct. 5	15 44. 0	0 58 37. 65	+ 7 33 49. 7	+1. 6	+ 5	Leip. II, A. G. 355, 364, 368, 378.
5	16 59. 5	0 58 34. 63	+ 7 33 25. 4	+1. 6	+ 5	Leip. II, A. G. 364, 368, 378, 386.
6	16 53. 5	0 57 38. 55	+ 7 24 53. 3	+1. 6	+ 5	Leip. II, A. G. 350, 353, 357, 364.
8	16 50. 0	0 55 45. 36	+ 7 7 47. 1	+1. 6	+ 5	Leip. II, A. G. 335, 345, 350.
(542) SUSANNA						
		(1916.0)		B. J. 1918		
1916 Jan. 7	17 27. 1	8 3 45. 40	+ 9 20 24. 4	−5. 1	+ 3	Leip. II, A. G. 4371, 4384, 4388.
8	17 8. 3	8 2 56. 89	+ 9 24 41. 4	−5. 1	+ 3	Leip. II, A. G. 4338, 4371, 4372.
(546) HERODIAS						
		(1925.0)		O. E. 1923		
1923 Apr. 16	15 54. 0	12 11 18. 91	+ 3 55 50. 5	+1. 9	−19	Alb., A. G. 4447, 4449, 4452, 4455.
18	15 30. 0	12 9 39. 43	+ 3 50 10. 5	+1. 9	−19	Alb., A. G. 4445, 4447, 4449, 4455.
(551) ORTRUD						
		(1916.0)		B. J. 1918		
1916 Mar. 11	16 21. 0	10 36 35. 82	+ 9 4 55. 9	−5. 7	+33	Leip. II, A. G. 5545, 5552, 5554.
31	14 20. 5	10 24 41. 97	+10 11 3. 2	---	--	Leip. I, A. G. 4029, 4037, 4045.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
			(556) PHYLLIS			
		(1915.0)		B. J. 1917		
1915	h m	h m s	° ′ ″	m	′	
Oct. 30	14 27. 5	1 7 29. 72	+16 35 50. 2	−0. 2	0	Ber. A, A. G. 335, 342, 343.
Nov. 3	14 16. 0	1 4 20. 36	+16 8 42. 9	−0. 2	0	Ber. A, A. G. 308, 309, 335.
			(565) MARBACHIA			
1922		(1925.0)		O. E. 1922		
Nov. 24	16 44. 0	4 21 14. 38	+15 27 38. 3	+0. 5	− 6	Leip. I, A. G. 1285, 1290, Ber. A, A. G. 1171, 1174, 1175.
Dec. 12	14 47. 0	4 3 39. 26	+13 19 54. 0	+0. 6	− 6	Leip. I, A. G. 1199, 1200, 1201, 1208, 1210.
			(569) MISA			
1920		(1925.0)		O. E. 1920		
Feb. 16	15 17. 0	8 59 37. 70	+16 27 32. 0	+0. 1	− 1	Ber. A, A. G. 3638, 3644, 3647, 3664.
17	14 21. 1	8 58 49. 31	+16 30 22. 8	+0. 1	− 1	Ber. A, A. G. 3638, 3644, 3647.
			(572) REBEKKA			
1916		(1916.0)		B. J. 1918		
Sept. 17	16 17. 5	22 3 59. 30	− 1 1 8. 6	+6. 6	+18	Nicol., A. G. 5576, 5578, 5580.
19	13 49. 8	22 3 3. 48	− 1 22 48. 6	+6. 6	+18	Nicol., A. G. 5575, 5576, 5578.
			(584) SEMIRAMIS			
1917		(1917.0)		O. E. 1917		
Jan. 30	15 11. 5	8 4 29. 34	+13 39 23. 4	+1. 2	−12	Leip. I, A. G. 3279, 3280, 3293.
Feb. 14	13 24. 8	7 50 32. 80	+13 44 28. 3	+1. 2	−11	Leip. I, A. G. 3146, 3147, 3156.
			(595) POLYXENA [1]			
1914		(1914.0)		B. J. 1916		
Oct. 22	16 35. 0	2 43 51. 09	+23 28 1. 1	+8. 2	+81	Ber. B, A. G. 832, 840.
			(600) MUSA			
1918		(1918.0)		O. E. 1918		
Feb. 11	16 19. 4	9 52 34. 32	+14 22 2. 6	−1. 7	+ 7	Leip. I, A. G. 3898, 3900, 3905.
12	16 20. 6	9 51 43. 42	+14 30 25. 0	−1. 7	+ 7	Leip. I, A. G. 3898, Ber. A, A. G. 3984, 3986.
1922		(1925.0)		O. E. 1922		
Jan. 24	15 6. 0	7 17 55. 50	+15 28 35. 2	−0. 9	+ 2	Ber. A, A. G. 2783, 2784, 2793, 2807.
25	15 10. 0	7 17 3. 67	+15 34 14. 2	−0. 9	+ 2	Ber. A, A. G. 2783, 2784, 2792, 2793.
			(601) NERTHUS			
1916		(1916.0)		B. J. 1918		
Apr. 10	16 4. 0	12 32 12. 40	+ 5 1 16. 6	+0. 7	+ 3	Leip. II, A. G. 6176, 6180, 6187.

[1] Identity questioned.

(619) TRIBERGA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1914.0)		B. J. 1916		
1914	h m	h m s	° ′ ″	m	′	
Nov. 9	17 3. 0	3 15 44. 18	+ 2 35 25. 9	+1. 3	− 2	Alb., A. G. 958, 964.

(628) CHRISTINE

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1920		(1925.0)		O. E. 1920		
Apr. 24	16 58. 0	13 44 20. 08	+ 8 51 43. 6	−1. 2	+ 4	Leip. II, A. G. 6492, 6506, 6509, 6514, 6518.
May 14	15 10. 0	13 29 44. 76	+ 9 2 29. 9	−1. 2	+ 4	Leip. II, A. G. 6434, 6438, 6441, 6443.

(631) PHILIPPINA

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1923		(1925.0)		O. E. 1923		
Nov. 9	14 4. 0	1 55 53. 19	+16 3 43. 5	−1. 2	− 7	Ber. A, A. G. 564, 565, 566, 567, 571, 573, 576.
10	14 36. 0	1 55 9. 31	+15 52 47. 0	−1. 2	− 7	Ber. A, A. G. 554, 564, 565, 566, 567, 571, 573.

(637) CHRYSOTHEMIS [1]

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1921		(1925.0)		O. E. 1921		
Oct. 5	15 44. 0	0 53 56. 70	+ 5 41 59. 9	+8. 8	+44	Leip. II, A. G. 328, 330, 341, 343.
6	16 53. 5	0 53 6. 70	+ 5 37 56. 8	+8. 8	+44	Leip. II, A. G. 304, 307, 328, 330.

(659) NESTOR [1]

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1914		(1914.0)		B. J. 1916		
Nov. 21	16 5. 0	3 15 8. 54	+23 16 12. 8	−3. 6	−15	Ber. B, A. G. 981, 984, 987.

(694) EKARD

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1922		(1925.0)		O. E. 1922		
Nov. 17	14 36. 5	2 8 4. 82	+16 35 24. 3	−10. 5	−15	Ber. A, A. G. 615, 616, 621.
21	14 19. 0	2 6 24. 79	+15 39 26. 9	−10. 1	−15	Ber. A, A. G. 610, 612, 614, Leip. I, A. G. 640.

(696) LEONORA

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1914		(1914.0)		B. J. 1916		
Oct. 19	14 46. 5	0 42 11. 46	+27 31 25. 7	−9. 4	−72	Camb. Eng., A. G., 434, 443, 465.

(703) NOËMI

Date	G. M. T.	α	δ	O−C α	O−C δ	Authority
1923		(1925.0)		O. E. 1923		
Nov. 14	15 58. 0	3 34 37. 25	+17 27 43. 0	−3. 7	−11	Ast. Bordeaux +17° 3^h 32^m, 43, 64, 72, 85, 91, 148, 173.

[1] Identity questioned.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(709) FRINGILLA						
		(1914.0)		B. J. 1916		
1914	h m	h m s	° ′ ″	m	′	
Oct. 27	16 23. 0	3 3 4. 33	+42 38 46. 8	−3. 7	−13	Bonn, A. G. 2621, 2624, 2658.
Nov. 6	14 8. 8	2 52 17. 26	+42 29 41. 8	−3. 7	−14	Bonn, A. G. 2503, 2518, 2520.
(712) BOLIVIANA						
1914		(1914.0)				
Nov. 17	16 47. 0	3 17 20. 22	+17 13 27. 8	---	--	Ber. A, A. G. 888, 902.
(714) ULULA						
1916		(1916.0)		B. J. 1918		
Aug. 2	15 49. 0	20 42 23. 33	+ 5 10 3. 6	−0. 9	− 5	Leip. II, A. G. 10325, Alb., A. G. 7258, 7267.
(723) HAMMONIA						
1916		(1916.0)		B. J. 1918		
Oct. 17	16 27. 0	1 22 52. 05	+ 3 39 23. 6	+2. 1	+ 9	Alb., A. G. 395, 401, 403.
22	16 16. 6	1 19 9. 44	+ 3 11 14. 0	+2. 1	+ 9	Alb., A. G. 369, 374, 381.
(727) NIPPONIA						
1916		(1916.0)		B. J. 1918		
Jan. 7	16 26. 1	7 29 1. 87	+11 37 8. 0	−2. 5	0	Leip. I, A. G. 2973, 2986, 2988.
8	16 1. 0	7 28 4. 58	+11 45 20. 4	−2. 5	0	Leip. I, A. G. 2962, 2966, 2973.
(729) WATSONIA						
1922		(1925.0)		O. E. 1922		
June 21	16 14. 0	16 35 59. 40	− 0 1 59. 1	+5. 3	−28	Nicol., A. G. 4178, 4179, 4183, 4186.
23	15 9. 0	16 34 34. 53	− 0 16 2. 4	+5. 3	−28	Nicol., A. G. 4177, 4178, 4179, 4183.
(731) SORGA						
1914		(1914.0)		B. J. 1916		
Oct. 19	16 42. 2	2 10 8. 45	+ 7 55 58. 1	−6. 0	−49	Leip. II, A. G. 840, 863.
21	16 40. 0	2 8 18. 14	+ 7 53 58. 3	−6. 0	−49	Leip. II, A. G. 834, 840.
(733) MOCIA						
1915		(1915.0)		B. J. 1917		
Feb. 21	16 51. 0	9 59 25. 26	+20 57 25. 3	−4. 7	+55	Ber. B, A. G. 3905, 3916, 3927.
Mar. 9	14 6. 0	9 45 20. 20	+20 30 13. 0	−4. 6	+52	Ber. B, A. G. 3853, 3857, 3860.

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(734) BENDA						
		(1925.0)		O. E. 1923		
1923	h m	h m s	° ′ ″	m	′	
Oct. 9	16 57. 0	0 48 12. 84	+ 6 50 24. 5	+0. 9	+11	Leip. II, A. G. 276, 280, 289, 293, 297, 298, 300, 306.
17	15 18. 0	0 41 55. 91	+ 6 25 55. 3	+0. 9	+11	Leip. II, A. G. 242, 243, 249, 251, 252, 254, 262.
(738) ALAGASTA						
1922		(1925.0)		O. E. 1922		
Nov. 21	15 36. 0	3 33 58. 16	+14 3 53. 0	+0. 7	+ 4	Leip. I, A. G. 1049, 1054, 1060, 1067.
23	15 55. 5	3 32 16. 97	+13 58 43. 2	+0. 7	+ 4	Leip. I, A. G. 1047, 1048, 1049, 1054.
(742) [1913 QU]						
1916		(1916.0)		B. J. 1918		
Oct. 24	16 42. 3	2 31 24. 01	+ 5 39 29. 4	+2. 8	+28	Leip. II, A. G. 951, 955, 963.
26	17 12. 9	2 29 35. 02	+ 5 37 37. 8	+2. 8	+28	Leip. II, A. G. 944, 951, 955.
(743) [1913 QV]						
1922		(1925.0)		O. E. 1922		
Jan. 30	14 42. 0	8 3 45. 64	+13 3 32. 1	−3. 0	+10	Leip. I, A. G. 3273, 3274, 3280.
31	14 27. 0	8 2 53. 83	+13 6 26. 9	−3. 0	+10	Leip. I, A. G. 3248, 3271, 3273.
(752) SULAMITIS						
1917		(1917.0)		O. E. 1917		
May 1	16 54. 8	15 38 42. 48	−13 46 7. 8	−1. 2	+ 5	Camb., U. S., A. G. 5468, 5476, 5479.
(754) MALABAR						
1921		(1925.0)		O. E. 1921		
July 27	16 22. 0	20 13 55. 28	+ 9 58 5. 0	+0. 1	+ 6	Leip. II, A. G. 9934, 9967, 9978, Leip. I, A. G. 7815.
Aug. 4	16 10. 0	20 8 7. 87	+ 9 4 25. 4	+0. 1	+ 6	Leip. II, A. G. 9870, 9872, 9882, 9906.
(762) PULCOVA						
1914		(1914.0)				
Dec. 21	13 16. 5	3 58 52. 69	+36 17 27. 5	---	--	Lund, A. G. 2069, 2097.
(764) [1913 SU]						
1915		(1915.0)		B. J. 1917		
Jan. 15	15 57. 0	7 6 0. 06	+15 16 9. 8	−0. 6	− 1	Ber. A, A. G. 2660, Leip. I, A. G. 2744, 2760.

(766) [1913 SW]

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1915.0)		B. J. 1917		
1915	h m	h m s	° ′ ″	m	′	
Feb. 10	14 39. 0	8 22 20. 00	+33 6 27. 4	−6. 1	+25	Leid., A. G. 3526, 3528, 3531, 3537.
17	15 10. 8	8 16 38. 44	+32 54 39. 2	−6. 0	+24	Leid., A. G. 3487, 3494, 3496.

(769) TATIANA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1914		(1914.0)				
Dec. 22	14 42. 0	5 7 13. 15	+29 31 16. 0	---	--	Camb. Eng., A. G. 2338, 2349.
1915		(1915.0)				
Jan. 5	14 22. 0	4 56 23. 30	+29 19 57. 1	---	--	Camb. Eng., A. G. 2258, 2260.
9	13 29. 4	4 53 51. 66	+29 15 30. 2	---	--	Camb. Eng., A. G. 2245, 2254.

(773) [1913 TV]

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1915		(1915.0)		B. J. 1917		
Feb. 18	17 10. 0	10 2 10. 98	+ 8 51 10. 1	−1. 0	+11	Leip. II, A. G. 5359, 5361, 5373.
19	16 39. 1	10 1 13. 14	+ 8 51 39. 4	−1. 0	+11	Leip. II, A. G. 5356, 5359, 5361.
Mar. 9	15 43. 5	9 44 36. 33	+ 8 59 17. 4	−0. 9	+11	Leip. II, A. G. 5252, 5259, 5260.

(779) NINA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1915		(1915.0)		B. J. 1917		
Mar. 21	17 23. 0	12 34 44. 97	−26 53 53. 9	−0. 4	+ 2	Boss Prelim. Gen. Cat. 3293, Arg. Gen. Cat. 17236.
23	17 16. 0	12 32 57. 62	−26 49 27. 7	−0. 4	+ 2	Boss Prelim. Gen. Cat. 3293, Arg. Gen. Cat. 17236.

(785) ZWETANA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1916		(1916.0)		B. J. 1918		
Nov. 3	16 11. 0	2 43 43. 95	+ 5 26 21. 7	+0. 7	+10	Leip. II, A. G. 1017, 1041, 1043.
16	16 34. 0	2 31 19. 24	+ 5 11 36. 0	+0. 8	+11	Leip. II, A. G. 951, 955, 978.

(787) MOSKVA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1915		(1915.0)				
Sept. 15	18 15. 0	1 6 10. 58	+ 5 37 0. 9	---	--	Alb., A. G. 310, Leip. II, A. G. 416, 428.
16	18 47. 0	1 5 36. 99	+ 5 25 8. 6	---	--	Alb., A. G. 302, 310, Leip. II, A. G. 416.
1919		(1925.0)		O. E. 1919		
Sept. 24	15 35. 8	0 28 6. 92	+ 2 41 51. 9	+1. 0	0	Alb., A. G. 90, 102, 105.
25	16 0. 4	0 27 22. 32	+ 2 28 33. 6	+1. 0	0	Alb., A. G. 86, 90, 99.
26	16 0. 0	0 26 38. 57	+ 2 15 29. 7	+0. 9	0	Alb., A. G. 86, 96, 99.
27	16 8. 3	0 25 54. 18	+ 2 2 19. 7	+0. 9	− 1	Alb., A. G. 85, 86, 96.
28	16 5. 0	0 25 10. 12	+ 1 49 17. 6	+0. 9	− 1	Alb., A. G. 85, 86, 99.
29	15 52. 0	0 24 26. 35	+ 1 36 20. 6	+0. 9	− 1	Alb., A. G. 85, 86, 96.
Oct. 3	16 27. 0	0 21 30. 31	+ 0 44 17. 5	+0. 9	− 1	Nicol., A. G. 56, 57, 62, 65.
Nov. 14	13 41. 0	0 6 26. 03	− 5 14 41. 3	+0. 8	+ 1	Strasz., A. G. 15, 18, 34.
15	13 37. 0	0 6 34. 98	− 5 17 46. 3	+0. 8	+ 1	Strasz., A. G. 15, 18, 34.
18	13 16. 0	0 7 10. 38	− 5 25 25. 7	+0. 8	+ 1	Strasz., A. G. 18, ½ (Strasz., A. G. 27+Wien-Ottak., A. G. 20), ½ (Strasz., A. G. 34+Wien-Ottak., A. G. 25).

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
(792) METCALFIA						
		(1917.0)		O. E. 1917		
1917	h m	h m s	° ′ ″	m	′	
Aug. 17	17 3. 0	22 8 20. 26	+ 1 15 24. 1	−0. 1	+ 2	Alb., A. G. 7713, Nicol., A. G. 5592, 5597.
18	17 28. 1	22 7 27. 78	+ 1 12 20. 4	−0. 1	+ 2	Nicol., A. G. 5585, 5592, 5597.
(797) MONTANA						
1916		(1916.0)		B. J. 1918		
Mar. 9	13 6. 3	9 13 8. 64	+ 8 47 51. 8	−0. 4	+ 2	Leip. II, A. G. 5040, 5044, 5048.
9	14 13. 3	9 13 9. 35	+ 8 47 58. 9	−0. 4	+ 2	Leip. II, A. G. 5040, 5044, 5048.
1922		(1925.0)		O. E. 1922		
Oct. 24	16 26. 0	1 36 15. 09	+13 54 6. 8	−3. 0	−15	Leip. I, A. G. 488, 491, 498, 499.
25	15 19. 0	1 35 24. 98	+13 47 43. 1	−3. 0	−15	Leip. I, A. G. 478, 479, 483, 491, 494.
(860) URSINA						
1922		(1925.0)		O. E. 1922		
Feb. 28	14 52. 0	9 37 45. 30	+ 7 18 19. 1	−1. 6	+14	Leip. II, A. G. 5200, 5218, 5221, 5223.
Mar. 5	15 41. 0	9 33 36. 13	+ 7 26 37. 2	−1. 6	+15	Leip. II, A. G. 5187, 5191, 5196, 5197.
(886) WASHINGTONIA						
1917		(1917.0)		A. J. No. 739		
Nov. 16	16 17. 3	2 49 30. 91	+ 9 20 59. 8	−0. 2	+ 1	Leip. II, A. G. 1064, 1068, 1083.
17	15 5. 6	2 48 35. 70	+ 9 25 18. 2	−0. 2	0	Leip. II, A. G. 1064, 1068, 1083.
19	13 58. 3	2 46 44. 24	+ 9 34 26. 4	−0. 2	0	Leip. II, A. G. 1044, 1052, Leip. I, A. G. 834.
Dec. 1	14 20. 4	2 36 54. 84	+10 36 6. 1	−0. 2	0	Leip. I, A. G. 784, 794, Leip. II, A. G. 992.
5	14 28. 2	2 34 23. 43	+10 58 52. 1	−0. 1	0	Leip. I, A. G. 763, 766, 784.
10	14 8. 2	2 31 51. 54	+11 28 37. 8	−0. 1	0	Leip. I, A. G. 750, 764, 766.
15	14 7. 9	2 30 1. 40	+12 0 6. 9	−0. 1	0	Leip. I, A. G. 734, 741, 745, 749.
1918		(1918.0)				
Jan. 9	12 37. 1	2 31 32. 10	+14 56 14. 4	−0. 1	0	Leip. I, A. G. 747, 754, 760.
1919		(1925.0)		O. E. 1919		
Jan. 24	15 49. 5	9 19 17. 27	+37 51 44. 3	−0. 8	0	Lund, A. G. 4589, 4590, 4593, 4605.
27	15 25. 5	9 16 31. 41	+38 7 32. 0	−0. 8	0	Lund, A. G. 4571, 4574, 4583.
31	15 46. 5	9 12 43. 32	+38 26 29. 3	−0. 8	0	Lund, A. G. 4550, 4553, 4557, 4559, 4562.
1923		(1925.0)		O E. 1923		
Dec. 8	14 54. 0	5 58 45. 93	+33 57 28. 9	+10. 9	+42	Leid., A. G. 2412 2419, 2420, 2421, 2423, 2425, 2426.
11	15 11. 0	5 55 30. 41	+34 13 18. 7	+10. 9	+42	Leid., A. G. 2373, 2376, 2383, 2390, 2402, 2405, 2412.
(906) REPSOLDA						
1923		(1925.0)		O. E. 1923		
Nov. 10	15 37. 0	2 52 54. 41	+18 36 29. 1	−0. 6	− 3	Ber. A, A. G. 778 786, 787, 790, 796, 799.
13	14 52. 0	2 49 58. 47	+18 35 52. 7	−0. 6	− 3	Ber. A, A. G. 772, 773, 774, 778, 786, 787.

(915) COSETTE

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1925.0)		O. E. 1921		
1921	h m	h m s	° ′ ″	m	′	
Oct. 5	15 44. 0	1 3 2. 48	+ 7 56 20. 2	+0. 5	+ 7	Leip. II, A. G. 399, 400, 402, 404.
5	16 59. 5	1 2 59. 18	+ 7 56 15. 4	+0. 5	+ 7	Leip. II, A. G. 399, 402, 412, 413.
6	16 53. 5	1 1 56. 10	+ 7 54 44. 4	+0. 5	+ 7	Leip. II, A. G. 393, 394, 399, 405.
8	16 50. 0	0 59 48. 28	+ 7 51 27. 0	+0. 5	+ 7	Leip. II, A. G. 364, 368, 392, 393.

(925) ALPHONSINA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1920		(1925.0)		A. N. No. 5105		
Jan. 28	14 6. 5	7 48 23. 02	+20 50 49. 4	−0. 2	− 2	Ber. B, A. G. 3144, 3154, 3155, 3160, 3161.
Feb. 25	14 33. 9	7 25 35. 88	+17 50 41. 2	−0. 2	− 1	Ber. A, A. G. 2855, 2859, 2864, 2885.
				O. M. No. 305		
Mar. 17	15 10. 0	7 24 43. 55	+15 48 13. 7	+0. 1	− 1	Ber. A, A. G. 2844, 2850, 2852, 2857, 2874.
1922		(1925.0)		O. E. 1922		
Sept. 12	14 36. 0	21 16 9. 46	+ 1 42 12. 7	+0. 1	+ 4	Alb., A. G. 7468, 7469, 7470, Nicol., A. G. 5427.
13	14 8. 0	21 15 29. 93	+ 1 40 43. 4	+0. 1	+ 4	Alb., A. G. 7466, 7468, 7469, ½ (Alb., A. G. 7461+Nicol., A. G. 5418).

(945) BARCELONA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1921		(1921.0)				
Feb. 12	15 54. 0	9 1 12. 93	+17 24 16. 6	---	--	Ast. Bordeaux +17° 9h 0m, 55, 61, 68, 69, 70, 74.
14	15 30. 0	8 58 4. 32	+16 59 7. 7	---	--	Ast. Bordeaux +17° 9h 0m, 11, 12, 18, 19, 141, 153.
Mar. 1	14 39. 0	8 38 12. 55	+13 50 39. 3	---	--	Ast. Bordeaux +14° 8h 40m, 21, 118, 119, 124, 132.
11	14 5. 8	8 29 41. 60	+11 52 20. 5	---	--	Leip. I, A. G. 3432, 3433, 3440, 3456, 3471, 3473.

(980) ANACOSTIA

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1921		(1925.0)		A. J. No. 807		
Nov. 21	11 26. 0	22 13 36. 04	+ 9 36 28. 6	0. 0	0	Leip. II, A. G. 11191, 11207, 11208, 11209.
25	11 16. 0	22 18 26. 56	+ 9 40 7. 9	0. 0	0	Leip. II, A. G. 11234, 11240, 11242.
29	11 12. 0	22 23 34. 09	+ 9 46 1. 3	0. 0	0	Leip. II, A. G. 11266, 11270, 11274, 11276.
Dec. 1	11 18. 0	22 26 13. 89	+ 9 49 48. 8	0. 0	0	Leip. II, A. G. 11284, 11286, 11288, 11292.
3	11 12. 0	22 28 57. 52	+ 9 54 16. 3	0. 0	0	Leip. II, A. G. 11288, 11292, 11306, Leip. I, A. G. 8993.
9	10 58. 0	22 37 26. 60	+10 10 30. 5	0. 0	0	Leip. II, A. G. 11357, 11362, Leip. I, A. G. 9070.
22	10 52. 0	22 57 23. 24	+11 1 34. 7	0. 0	0	Leip. I, A. G. 9173, 9183, 9188, 9193.
27	11 8. 0	23 5 33. 35	+11 26 33. 3	0. 0	0	Leip. I, A. G. 9215, 9226, 9228, 9231.
1922						
Jan. 2	11 11. 0	23 15 38. 05	+11 59 43. 8	0. 0	0	Leip. I, A. G. 9274, 9279, 9280, 9282.
7	10 57. 0	23 24 13. 82	+12 29 58. 8	0. 0	0	Leip. I, A. G. 9314, 9317, 9326, 9327.
14	11 16. 0	23 36 37. 08	+13 16 6. 1	0. 0	0	Leip. I, A. G. 9374, 9398, 9399, 9400, 9408.
24	11 34. 0	23 54 48. 95	+14 27 55. 8	0. 0	+ 1	Leip. I, A. G. 9490, 9502, 9505, 9522.
25	11 44. 4	23 56 40. 79	+14 35 29. 5	0. 0	+ 1	Leip. I, A. G. 9505, 9514, 9517, 9522, 9524, 9525, 9529, 9530.

(980) ANACOSTIA—Continued

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
		(1925.0)		A. J. No. 815		
1922	h m	h m s	° ′ ″	m	′	
Sept. 26	21 27. 8	7 44 53. 95	+24 46 34. 3	+1. 9	− 8	Camb. Eng., A. G. 4175, 4191, 4206, Ber. B, A. G. 3135, ½ (Camb. Eng., A. G. 4189+Ber. B, A. G. 3131), ½ (Camb. Eng., A. G. 4204+Ber. B. A. G. 3137).
Oct. 30	21 28. 0	8 15 4. 18	+21 48 38. 3	+1. 0	− 7	Ber. B, A. G. 3331, 3334, 3335, 3341.
1923						
Jan. 9	15 33. 0	7 49 53. 09	+17 52 8. 9	−0. 7	− 3	Ber. A, A. G. 3072, 3075, 3081, 3091, 3095, 3097.
13	14 32. 0	7 45 39. 12	+17 44 32. 1	−0. 8	− 3	Ber. A, A. G. 3027, 3030, 3035, 3053, 3055, 3061, 3062.
Apr. 16	13 21. 0	7 22 14. 29	+15 30 18. 7	−4. 2	+22	Ber. A, A. G. 2811, 2824, 2844, 2850, ½ (Ber. A, A. G. 2848+Leip. I, A. G. 2922).
1924		(1925.0)		O. E. 1924		
Mar. 31	15 21. 0	11 26 56. 26	−20 38 30. 3	+1. 8	−17	Alger Cat. (1900), 5034, 5038, 5041, 5046, 5047.
Apr. 8	14 57. 0	11 21 0. 99	−19 49 23. 7	+1. 8	−17	Alger Cat. (1900), 4991, 4995, 5000, 5011, 5022.

(1028) [1923 PG]

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1923		(1925.0)				
Nov. 13	16 14. 0	3 49 54. 89	+17 53 39. 3	---	--	Ber. A, A. G. 1025, 1031, 1038, 1044, 1045, 1048.
14	15 58. 0	3 49 5. 06	+17 53 42. 6	---	--	Ber. A, A. G. 1025, 1026, 1027, 1031, 1038, 1041, 1042.
Dec. 1	15 23. 0	3 34 42. 20	+17 54 49. 8	---	--	Ber. A, A. G. 974, Ast. Bordeaux +17° 3h 32m, 59, 64, 71, 75, 81.

[1915 YJ]

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1915		(1915.0)				
Feb. 18	17 10. 0	9 57 48. 60	+ 9 6 34. 4	---	--	Leip. II, A. G. 5328, 5336, 5347.
19	16 39. 1	9 56 55. 46	+ 9 9 11. 4	---	--	Leip. II, A. G. 5320, 5328, 5336.
Mar. 9	15 43. 5	9 41 59. 28	+ 9 54 10. 8	---	--	Leip. II, A. G. 5236, 5252, Leip. I, A. G. 3871.

ASTEROID

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1915		(1915.0)				
Sept. 10	17 47. 0	23 42 3. 22	+ 7 34 47. 4	---	--	Leip. II, A. G. 11759, 11771, 11778.
12	17 38. 0	23 40 15. 24	+ 7 34 34. 8	---	--	Leip. II, A. G. 11746, 11753, 11759.

[1916 BA]

Date	G. M. T.	Astrographic α	Astrographic δ	O−C α	O−C δ	Authority
1916		(1916.0)				
Apr. 10	17 9. 5	13 8 58. 41	+ 0 16 9. 6	---	--	Nicol., A. G. 3537, 3552, 3553.

PHOTOHELIOGRAPHIC OBSERVATIONS

THE PHOTOHELIOGRAPH—DESCRIPTION OF THE INSTRUMENT AND METHODS OF OBSERVATION

By G. H. PETERS

The optical parts of the photoheliograph were made by Alvan Clark & Sons, of Cambridgeport, Mass., for the Transit of Venus Commission.[1] The mechanical parts as originally employed, including the heliostat, plate-holding, and other attachments, were also furnished by this firm. Briefly, this type of instrument has the following design:

The object glass of the photoheliograph is of 5 inches aperture corrected for the actinic rays with the minimum focus in the *G* region of the spectrum. The focal length is nearly 40 feet, giving an image of the Sun about 4¼ inches in diameter.

The optical axis of this lens is horizontal and in the meridian and north of the plateholder. The Sun's image is projected through the lens, down this axis, by means of a 7-inch plane mirror. This glass mirror is unsilvered to reduce the intensity of the solar rays and is wedge shaped, with the front surface optically flat and the back surface approximately so.

The Sun's image is formed from the rays reflected from the front surface of the mirror, those from the back surface being deviated by the action of the prism. Therefore the back surface reflections do not interfere with the primary solar image. The mirror in its cell is mounted on trunnions in a fork at the lower end of the polar axis of the heliostat, which is adjustable for latitude. Both quick and slow motions are provided on the heliostat, in each coordinate, for setting the solar image from the objective in the proper position. The exposure of the photographic plate to the solar image is practically instantaneous. Therefore for photographs of the photospheric regions a stationary image secured by a driving clock is unnecessary and is not employed.

At the northern end of the photoheliograph is a substantial brick pier, upon which is a heavy iron casting carrying a pair of rails. A coffin-shaped flat casting rests upon these rails and supports the 5-inch objective in its mounting and also the heliostat. The rails provide means for a rough adjustment for focus.[2] For adjustment of position the heliostat can be moved in any direction within moderate limits. Screws in its tripod base allow for leveling and elevation.

The solar image is received inside the dark room of the photographic laboratory building through an aperture in its northern wall. Here upon a pier is mounted the plate-holding apparatus which carries plates 7 inches square. Near the middle

[1] See Observations of the Transit of Venus, Dec. 8–9, 1874, made and reduced under the direction of the commission created by Congress, edited by SIMON NEWCOMB, professor, U. S. Navy, secretary of the commission. Washington, Government Printing Office, 1880.

[2] On account of variations of focal length by temperature, the plate-holding attachment was subsequently controlled for focus by a micrometer screw. See report of the superintendent, 1902, p. 27. A paper by G. H. PETERS, "The Photoheliograph of the U. S. Naval Observatory, its use and defects in Solar Photography." See Publications Astronomical and Astrophysical Society of America, Vol. I, p. 198, for abstract.

of the plate and close to its emulsion side hangs a plumb line of fine wire and a shadow image of this wire is impressed as a transparent line across the solar disk upon each photograph. This line, together with the time of exposure, are factors in determining solar positions.

Until December, 1899, a reticule plate was used just in front of the photographic plate to detect distortions of the solar image.

Dry plates were then substituted for those of the wet collodion process previously used on most occasions for solar photography. A slow lantern slide emulsion of fine grain, specially coated on plates 7 inches square, was hereafter employed.[3]

These dry plates were coated on the back just before exposure with Winsor and Newton moist lampblack, to which a few drops of water were added forming a paste. After exposure and before development this nonhalation backing was removed from the plate with a tuft of wet absorbent cotton.

The exposing shutter is located on the northern wall of the dark room and close to the iron pier supporting the plate attachment. The shutter originally provided was made mostly of wood and carried a narrow vertical slit with metallic jaws adjustable for aperture. This shutter was operated horizontally by hand, and through the slit the photographic plate was exposed to the Sun's image. A white disk, known as the target on the shutter's outer surface, indicated before exposure the correct position of the sun's image with respect to the plate.

To photograph the Sun, two persons were required, one to operate the shutter and the other to set the solar image on the target and record the time of exposure. Afterwards a vertical drop shutter was installed. This shutter was designed by Mr. C. B. Watts and constructed by the instrument maker, Mr. H. C. Cleve. It was made principally of aluminum, with micrometer control for width of slit, and could be released by the observer from outside near the objective. One person could thus perform the operations previously requiring two.

The space from the building, extending nearly to the pier carrying the optical parts of the instrument, is covered by a wooden shed supported upon four equidistant brick piers. The roof of the shed slopes symmetrically east and west and beneath the roof, between the piers, the space is open. Often the rising air currents under the roof were found to interfere seriously with solar definition. Fine meshed wire screens were fitted in these open spaces which materially improved conditions while still allowing ventilation.

With the Sun farthest south and near the meridian the north gable of the wooden shed covering the photoheliograph formerly interfered with the definition of the solar image. Improvement was effected by sawing back the gable for a distance of about 1 foot.

At noon during the winter season the heliostat mirror was partially in the shadow of the objective mounting. This condition was remedied by obtaining a cubical iron casting to carry the mirror, permitting the heliostat mounting to be moved slightly northward. The above-enumerated changes in instrument and methods covered a period of several years.

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[3] See Superintendent's Report, 1900, p. 21.

In its original form the instrument was poorly designed for the delineation of solar detail.[1] These deficiencies were realized at that time, but for want of better apparatus a short series of solar photographs was made in 1886.[2]

The present series of Sun photographs was begun by Mr. PETERS in October, 1898. During 1900 and 1901 Mr. PETERS was engaged principally with the eclipse expeditions of those years and the discussion of results obtained. Many of the improvements in the photoheliograph were made during these periods. The Sun photographs in the present form may be considered to have been started in 1902.

A well equipped department for magnetic observations formerly existed at the Naval Observatory. On account of interference by ground currents, developed principally by an electric traction line on a neighboring avenue, these observations were finally abandoned. The photographs of the Sun with the photoheliograph were intended originally to supplement the magnetic observations. During an interval of some years the Observatory solar data were exchanged with those of the magnetic observatory at Cheltenham, Md. Careful examination of the comparative data failed to give satisfactory results and at the beginning of the World War this exchange of data was discontinued.

Observations of a remarkable sunspot group observed from May 9 to 20, 1921, led to cooperation between the Naval Observatory and the Western Union Telegraph Co. At the time of this solar group, the only one then visible, unusually brilliant auroras appeared and electrical systems were affected over wide areas. On the land and cable lines of the Western Union much interruption to traffic occurred, and considerable damage was occasioned to their auxiliary apparatus. A conference at Washington was arranged shortly afterwards between Western Union officials and the Naval Observatory, and plans were formulated for making cooperative observations.

Throughout the sunspot minimum of 1923 relatively quiescent conditions have been noted on the lines of the Western Union. A brief account of the information furnished by the Western Union Telegraph Co. may be of interest. These data are furnished to the Naval Observatory monthly in chart form. Special detailed reports are also submitted immediately in case of unusual disturbances. The monthly chart compiled by the company is summarized under the following headings:

Section 1. Voltmeter observations.
Section 2. Interruption to traffic.
Section 3. Observations of auroras.
Section 4. Occurrence of sunspots.

The first three items are compiled by the company from data furnished by several of their different stations. The last item is from the Naval Observatory, furnished daily.

These Sun photographs have been made mostly by Mr. PETERS. During his absence at different times the following members of the staff have taken part in the observations:

G. F. COULON.	C. B. WATTS.
A. E. BOEGER.	G. HARRISON.
W. W. DINWIDDIE.	W. A. CONRAD.

[1] See Superintendent's Report, 1885, p. 9.
[2] See Superintendent's Report, 1886, pp. 10 and 17.

Recently a plan was worked out jointly by Mr. C. B. Watts and Miss E. A. Lamson for measuring the coordinates of solar spots. Standard charts were made to represent the projected parallels of latitude and longitude for each 10° of the visible solar hemisphere. To take account of the variation of the position of the solar axis and of the change of the Sun's apparent diameter as seen from the earth, 22 of these charts were prepared corresponding to a half year; by reversing the charts 180° in position angle they are used for the whole year.

Photographic transparencies of the charts were made on plates 7 inches square, the size of the Sun photographs. The scale of the charts on the transparencies corresponds therefore to the diameter of the solar image for a given epoch. From the charts the heliographic latitudes and differences of longitude of the spots or groups are read directly. A measuring machine was constructed by Mr. Ilse, instrument maker of the Naval Observatory, which can be set for position angle and which carries a transparency just beneath the solar photograph to be measured. To facilitate reading, the coordinates of the spots or groups, as well as their areas, and also to eliminate parallax in the readings, a magnifying glass mounted in a short tube and carried on an adjustable arm can be moved parallel to the plate.

When measuring with the machine, the plumb-line image on the photograph is made parallel with the central solar meridian on the transparency. The solar plate after being set to the computed position angle is centered with respect to the circular outline corresponding to the Sun's disk upon the transparency.

Except near the Sun's limb, where much foreshortening occurs, the measured positions of well-defined groups or spots are accurate to about one-half degree. In measuring the positions of large, irregular, or scattered groups the center of gravity is taken.

There is also provided a transparency for measuring areas which allows for foreshortening. The lines on this reseau enable the spot areas to be measured in terms of square degrees.

The heliographic latitudes and differences of longitude of the spots and groups on the Sun plates, together with their areas for the period 1917–1927, inclusive, have been measured by Mr. Peters, Miss Lamson, and Mrs. Zahn. The current observations, measured by Mr. Peters, appears each month in the Monthly Weather Review of the United States Department of Agriculture. The plates preceding 1917 have not yet been measured.

In the following list is given, together with the eastern standard time of observation, the Greenwich number of the group taken from the Greenwich Photo-Heliographic Results of the year. The differences of heliographic longitude and the heliographic latitudes are given to the nearest half degree, differences of longitude being reckoned from the central meridian or that meridian passing through the center of the Sun's disk at observation; longitudes west of the center are positive. The areas are corrected for foreshortening and are expressed in millionths of the Sun's visible hemisphere.

RESULTS OF PHOTOHELIOGRAPHIC OBSERVATIONS

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.[1]	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Jan. 2	12 0	7929	−39.0	+12.5	247	---
			−32.0	+13.0	---	216
		7926	−18.5	+12.5	154	---
			−17.5	+16.0	---	46
			−9.0	+16.0	648	---
		7923	+35.5	−10.5	15	---
		7931	+37.5	−21.5	---	15
		7920	+41.0	+10.0	108	---
		7918	+66.5	−21.0	---	154
6	11 58	7937	−63.0	+17.5	---	93
		7936	−27.5	−22.0	---	15
		7929	+14.5	+13.5	216	---
			+22.0	+13.0	185	---
		7926	+36.0	+13.5	---	15
			+44.0	+15.0	---	679
8	11 52	7941	−54.0	+17.0	---	123
		7937	−36.0	+18.0	---	93
		7940	+2.5	+12.5	---	77
		7938	+22.0	+15.0	31	---
		7935	+29.5	+10.5	---	62
		7929	+41.5	+13.0	170	---
			+49.5	+12.0	185	---
		7926	+71.5	+15.0	---	864
11	11 56	7949	−46.5	+20.0	---	15
		7943	−27.0	+17.5	---	31
		7942	−21.0	+14.0	---	31
		7941	−15.5	+17.0	---	93
			−12.0	+17.5	123	---
		7948	−14.0	−16.0	---	15
		7937	+2.0	+18.0	---	46
		7940	+38.5	+16.0	---	62
			+46.0	+11.5	37	---
		7947	+39.0	−22.0	---	31
		7939	+40.5	+24.0	31	---
			+48.5	+23.0	37	---
		7929	+82.0	+13.5	216	---
12	11 58	7949–89–90	−32.5	+20.0	---	62
		7943	−12.0	+17.5	---	31
		7942	−8.0	+14.0	62	---
		7941	−4.0	+17.0	---	62
			+1.5	+17.5	---	123
		7948	−0.5	−16.0	---	77
		7940	+52.0	+15.5	46	---
		7947	+55.0	−22.5	---	93
		7939	+56.0	+27.0	62	---
			+58.0	+23.5	---	123
17	11 56	7955	−78.0	−10.5	93	---
		7950	−26.0	−22.0	---	31
			−19.0	−19.0	---	93
		7949	+39.0	+20.0	123	---
		7953	+52.5	−17.0	---	46
		7942	+62.0	+12.0	62	---
		7941	+72.0	+17.0	---	93
18	11 53	7955	−65.0	−10.5	93	---
		7950	−6.0	−19.0	---	93
		7954	+32.5	+17.5	---	37
		7949	+52.0	+20.0	108	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.[1]	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Jan. 19	11 56	7957	−62.0	−25.0	---	62
		7956	−59.5	+29.0	31	---
		7955	−51.0	−10.5	123	---
		7952	−24.5	−21.5	9	---
			−20.0	−24.5	12	---
		7950	+7.5	−19.0	---	77
		7954	+46.0	+18.0	---	31
		7949	+63.5	+20.0	123	---
23	12 0	7960	−29.0	+15.0	31	---
			−25.0	+12.0	---	77
		7956	−12.0	+29.5	---	31
			−6.5	+29.0	93	---
		7955	+2.0	−10.5	93	---
		847b	+37.0	−17.5	---	15
		7950	+59.5	−19.5	31	---
26	11 51	7964	−73.0	+13.0	46	---
		7962	−55.5	+14.0	15	---
			−48.0	+12.5	31	---
		7963	−18.0	−17.5	15	---
		7961	+4.0	+9.0	9	---
		7960	+15.0	+11.0	---	46
		7956	+27.0	+28.5	15	---
			+32.0	+27.5	---	93
		7957	+29.0	−27.0	---	62
		7959	+33.0	−20.0	---	15
		7955	+43.5	−11.0	93	---
30	12 4	7970	−78.0	+1.5	---	154
		7969	−68.0	+23.0	185	---
		7968	−41.5	+23.5	---	15
		7964	−27.5	+12.5	---	31
		7967	−25.5	+7.0	---	9
		7962	−0.5	+13.5	---	15
			+8.0	+13.5	46	---
		7963	+34.5	−17.5	---	31
		7957	+78.0	−27.0	62	---
Feb. 2	11 57	7970	−34.0	+1.0	77	---
		7969	−28.0	+24.0	---	154
		7974	−10.0	+15.0	6	---
		7962	+49.0	+13.0	---	37
		7972	+76.0	−22.5	---	93
3	11 59	7977	−80.0	−17.5	---	309
			−65.0	−13.5	185	---
		7970	−21.0	+1.0	93	---
		7969	−18.0	+24.0	123	---
			−14.0	+23.5	31	---
		7976	+4.5	+26.0	62	---
			+8.0	+25.0	---	77
		7975	+55.0	+30.0	62	---
5	11 54	7979	−59.0	+7.0	108	---
		7977	−54.5	−17.0	---	309
			−47.5	−13.5	---	185
		7978	−47.0	+13.5	---	77
			−42.0	+12.5	---	62
		7970	+7.0	+0.5	62	---
		7969	+7.5	+24.5	---	46
		7976	+31.5	+27.5	93	---
			+36.0	+25.0	93	---

[1] Measured from central meridian, positive west.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Feb. 6	11 56	7980	−61.0	+20.0	46	---
		7981	−48.0	−12.5	31	---
			−44.0	− 8.0	---	15
		7979	−45.0	+ 7.0	62	---
		7977	−36.0	−13.5	---	1080
		7978	−33.0	+14.0	---	77
			−28.5	+13.5	---	62
		7970	+19.5	+ 0.5	37	---
		7976	+43.0	+27.5	154	---
			+49.0	+23.0	---	123
8	11 58	7980	−35.0	+20.5	22	---
		7979	−17.5	+ 7.0	31	---
		7977	−10.5	−17.0	---	1327
			− 2.5	−15.5	586	---
		7978	− 5.5	+14.5	---	46
			0.0	+11.0	---	62
		7976	+70.0	+27.5	46	---
10	11 58	7985	−33.5	+22.0	---	62
		7980	− 9.0	+20.5	12	---
		7982	+ 1.0	−15.0	6	---
		7979	+10.0	+ 7.5	40	---
		7977	+14.0	−17.5	---	1235
			+22.5	−14.5	---	1019
		7978	+27.5	+11.5	---	62
		7983	+37.0	+15.0	---	31
			+40.5	+17.0	93	---
12	11 54	7986	−68.0	−24.0	108	---
		7985	− 8.0	+21.5	---	93
		7980	+17.5	+20.0	31	---
		7987	+22.5	+23.5	---	77
		7979	+36.5	+ 7.5	31	---
		7977	+40.0	−17.5	---	1204
			+48.0	−14.0	---	1389
		7983	+68.0	+17.5	93	---
13	12 1	7986	−55.0	−24.0	123	---
		7989	− 2.0	−27.0	---	15
		7988	+ 3.0	−11.0	---	31
		7979	+49.5	+ 7.5	46	---
		7977	+52.5	−17.5	---	1327
			+62.0	−13.5	1358	---
14	12 0	7986	−44.0	−24.0	---	62
		7992	−36.0	−14.5	15	---
		7990	−33.0	−18.5	---	139
			+ 7.0	−10.5	---	15
		7991	+12.0	− 5.0	---	31
		7979	+62.0	+ 8.0	31	---
		7977	+70.0	−15.0	---	2346
24	11 59	7999	−68.0	+22.0	185	---
		7993	+66.0	−10.5	25	---
27	12 6	8003	−72.0	+12.5	15	---
		8002	−65.0	+27.5	31	---
		8000	−57.5	−20.5	62	---
		7999	−28.5	+21.5	123	---
Mar. 6	11 59	8012	−62.0	+21.5	---	525
		8008	−32.5	−18.0	---	231
			−28.0	−15.0	---	62
			−22.0	−14.5	185	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Mar. 6	11 59	8006	−15.0	−14.0	---	46
		8010	+ 8.0	+14.5	---	185
			+17.5	+11.0	---	185
		8002	+22.0	+27.5	---	46
			+27.0	+25.0	---	93
			+32.0	+25.5	---	139
		8009	+50.5	+24.0	185	---
			+59.0	+23.5	216	---
7	11 59	8012	−49.0	+21.0	---	556
		8008	−18.5	−17.5	---	185
			− 8.0	−15.0	---	185
		8006	− 2.0	−13.5	---	46
		8010	+22.0	+15.5	---	139
			+30.5	+11.0	---	123
		8002	+34.5	+27.5	---	46
			+39.5	+24.0	62	---
			+45.0	+25.0	---	154
		8009	+63.0	+24.5	154	---
			+72.0	+24.0	216	---
8	11 54	8012	−37.0	+21.0	---	432
		8008	− 7.5	−17.5	---	123
			+ 4.5	−14.5	---	170
		8006	+13.0	−14.0	---	46
		8010	+34.0	+15.5	---	93
			+43.5	+11.0	---	123
		8002	+49.0	+27.5	---	31
			+52.0	+24.5	93	---
			+59.5	+24.5	123	---
		8009	+76.0	+24.5	123	---
9	12 0	8012	−22.5	+21.0	---	340
		8008	+ 6.5	−17.5	---	93
			+18.0	−14.5	---	139
		8014	+28.0	− 9.0	---	22
		8006	+29.0	−14.5	---	6
		8010	+47.5	+15.5	---	77
			+58.0	+11.0	139	---
		8002	+65.0	+24.0	62	---
			+72.0	+24.5	108	---
10	12 2	8016	−17.5	+ 7.5	---	37
		8013	−17.0	−11.0	---	40
		8012	−10.0	+20.0	---	278
		8008	+19.0	−17.5	---	123
			+28.0	−14.0	---	46
			+32.0	−14.0	154	---
		8014	+42.0	− 9.5	---	31
		8010	+60.0	+15.0	46	---
			+71.0	+11.0	---	139
12	11 57	8019	−59.0	+ 7.0	62	---
		8017	− 9.0	+21.5	---	62
			− 5.0	+20.5	---	62
		8013	+12.0	−11.0	---	154
		8016	+12.5	+ 7.5	---	93
		8012	+17.0	+20.5	---	216
		8008	+44.5	−18.0	62	---
			+57.5	−14.5	---	185
		8020	+51.0	+14.0	---	15
			+55.0	+13.5	---	77
15	11 54	8023	−58.0	+13.5	62	---
		8024	−52.0	− 9.5	---	77
		8021	−47.0	−14.0	15	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1917	h m		°	°		
Mar. 15	11 54	8017	+29.5	+21.5	31	---
			+36.0	+21.0	---	31
		8013	+50.0	−12.5	46	---
			+54.5	−10.0	123	---
		8016	+51.0	+ 7.0	---	108
			+57.5	+ 7.5	---	62
		8012	+57.5	+20.5	185	---
16	12 6	8026	−69.5	−29.5	15	---
		8023	−44.0	+13.5	62	---
		8024	−41.0	−10.5	---	123
			−35.5	−10.5	---	170
		8021	−32.0	−14.5	12	
		8017	+42.0	+22.0	22	-----
			+49.0	+21.5	---	31
		8025	+50.0	+ 9.5	---	93
		8013	+62.5	−11.5	62	---
			+68.0	− 9.0	77	---
		8016	+63.0	+ 8.5	---	31
			+70.0	+ 8.5	31	---
		8012	+69.0	+21.0	---	154
19	11 54	8030	−75.0	+11.0	62	---
			−73.5	+ 8.5	123	---
		8027	−38.0	−14.5	---	31
		8026	−37.5	−30.0	---	46
			−32.0	−29.5	---	62
		8023	− 3.5	+14.0	15	---
		8024	− 0.5	− 9.5	---	93
			+ 7.5	−10.0	154	---
		8021	+ 9.5	−15.0	---	31
20	12 15	8031	−68.5	+ 8.5	---	139
		8029	−68.5	+20.0	77	---
			−62.0	+19.0	---	62
		8030	−62.0	+11.0	62	---
			−61.0	+ 8.5	139	---
		8027	−26.0	−15.0	---	31
		8026	−25.5	−30.0	---	15
			−17.5	−29.5	25	---
		8023	+10.0	+14.0	31	---
		8024	+12.0	− 9.5	---	40
			+21.0	−10.5	154	---
22	11 56	8031	−39.5	+ 8.0	---	77
		8029	−39.0	+18.0	---	108
			−34.5	+19.0	---	62
		8030	−32.5	+10.0	---	185
		8032	−30.0	+ 5.0	---	46
		8026	+ 2.5	−28.5	---	15
			+ 9.5	−29.0	---	62
		8027	+ 5.5	−15.0	9	---
		8024	+47.5	−10.0	139	---
24	11 56	8037	−70.0	+24.0	62	---
		8035	−68.0	+14.0	123	---
		8034	−62.0	+14.0	---	154
		8033	−22.0	+11.0	---	93
		8031	−11.5	+ 7.0	9	---
		8029	−10.0	+18.0	---	278
		8030	− 7.0	+10.0	---	123
		8027	+30.0	−17.0	---	31
		8026	+34.0	−30.0	---	31
		8024	+74.0	−10.0	31	---
1917	h m		°	°		
Mar. 26	11 55	8039	−71.0	+11.0	77	---
		8038	−66.0	+24.0	185	---
			−75.0	+21.5	31	---
		8037	−44.0	+24.0	31	---
		8035	−40.0	+14.5	---	216
		8034	−32.0	+15.0	---	77
		8036	−20.5	+10.5	---	62
		8033	+ 7.5	+10.5	6	---
		8029	+14.5	+19.0	---	46
			+19.5	+18.0	---	154
		8030	+21.0	+10.0	---	77
		8027	+54.0	−17.5	---	62
28	11 55	8039	−41.0	+ 9.0	---	62
		8038	−39.5	+23.5	62	---
		8035	−10.5	+13.5	---	216
		8034	− 4.0	+13.5	123	---
		8036	+10.0	+ 9.0	25	---
		8029	+45.0	+18.0	---	154
		8030	+47.5	+ 9.5	108	---
29	11 56	8038	−26.5	+23.5	---	77
		8039	−25.0	+ 8.5	---	93
		8035	+ 1.0	+14.0	---	201
		8034	+ 9.0	+13.5	---	77
		8036	+23.0	+ 9.0	---	15
		849h	+42.0	+11.5	9	---
		8029	+58.0	+17.5	---	123
		8030	+61.0	+ 9.5	108	---
30	11 57	8039	−14.0	+ 8.5	---	62
			− 9.0	+ 8.5	---	46
		8038	−13.5	+23.5	---	62
		8035	+13.5	+14.0	---	216
		8034	+22.5	+14.0	62	---
		8040	+30.5	−16.0	---	31
		8036	+37.0	+ 9.0	31	---
		8030	+73.0	+ 9.5	123	---
		8029	+74.0	+18.0	154	---
31	11 58	8038	− 1.0	+23.5	---	62
		8039	+ 1.0	+ 8.5	---	62
			+ 6.0	+ 9.0	---	31
		8035	+27.0	+14.0	---	201
		8034	+37.0	+13.5	93	---
		8040	+44.0	−16.5	---	31
		8036	+50.5	+ 9.0	15	---
Apr. 3	12 12	8042	−65.0	+ 6.0	15	---
		8041	−11.5	−22.0	6	---
		8035	+64.0	+14.5	---	154
		8034	+79.0	+13.0	93	---
		8040	+81.0	−16.0	31	---
4	11 56	8042	−52.0	+ 6.0	15	---
		8035	+80.0	+14.0	---	185
7	11 57	8042	−12.0	+ 6.5	---	15
9	12 0	8046	−73.0	− 9.0	93	---
			+29.0	− 7.0	15	---
		8045	+60.0	+16.5	46	---
10	11 56	8046	−60.5	− 9.0	93	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Apr. 11	12 1	8049	−75.0	+11.0	---	185
			−65.5	+10.0	293	---
		8050	−71.0	−16.0	31	---
		8048	−50.0	−14.5	---	31
		8046	−47.0	− 9.5	62	---
		8047	−39.0	+18.0	---	46
14	11 56	8054	−70.0	−28.0	62	---
		8052	−65.0	−10.0	---	108
			−59.0	− 9.0	62	---
		8053	−62.5	+ 7.0	---	108
		8051	−53.0	−13.5	---	62
		8049	−31.0	+11.0	---	340
			−24.0	+11.0	370	---
		8050	−30.5	−16.5	---	108
			−22.0	−14.5	---	46
		8048	− 7.5	−14.0	---	62
		8046	− 6.5	− 9.5	46	---
		8047	+ 1.5	+18.5	---	185
			+ 8.0	+18.0	247	---
16	11 57	8055	−73.0	+19.0	---	185
		8054	−43.0	−29.0	46	---
		8052	−39.0	− 9.0	---	62
			−31.0	− 8.5	25	---
		8053	−37.5	+ 8.0	---	15
			−33.0	+ 7.5	15	---
		8049	− 7.5	+12.0	---	154
			+ 2.0	+12.0	---	370
		8050	− 6.0	−17.0	---	31
			+ 3.0	−14.5	9	---
		8048	+19, 5	−13.0	---	123
		8046	+20.5	− 8.5	31	---
		8047	+27.0	+19.0	---	93
			+32.5	+19.0	---	278
17	11 56	8055	−60.5	+19.5	---	185
		8054	−30.0	−29.0	46	---
		8052	−26.5	− 9.0	---	31
			−20.5	− 8.5	---	25
		8053	−26.0	+ 8.0	---	15
			−20.0	+ 8.0	15	---
		8049	+ 4.0	+12.0	---	108
			+16.5	+12.0	---	370
		8046	+33.0	− 8.0	31	---
		8048	+34.0	−12.5	---	62
		8047	+39.5	+19.5	---	31
			+47.5	+19.5	---	278
18	12 0	8057	−69.0	−17.0	31	---
		8055	−47.5	+19.5	---	185
		8052	−17.5	−10.5	---	15
			− 8.5	− 9.0	---	62
		8054	−17.5	−29.0	31	---
		8053	− 6.0	+ 8.0	15	---
		8049	+20.0	+11.5	---	93
			+30.5	+10.5	370	---
		8050	+22.0	−17.5	---	62
		8048	+47.5	−13.5	---	77
		8046	+48.0	− 8.5	31	---
		8047	+60.0	+19.0	247	---
21	11 54	8058	−52.5	+11.5	---	15
			−52.0	+14.5	9	---
			−45.0	+13.0	---	123
			−40.0	+13.5	---	93

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Apr. 21	11 54	8055	− 8.0	+19.5	123	---
		8056	+ 9.5	+20.0	---	15
		8054	+21.0	−29.0	---	46
			+24.5	−27.0	---	31
		8050	+65.0	−15.5	15	---
		8049	+70.0	+10.0	278	---
23	11 59	8059	−64.0	−17.5	---	123
		8058	−23.5	+11.5	---	123
			−18.0	+12.0	---	46
			−12.5	+12.0	108	---
		8055	+18.5	+20.0	---	93
			+19.5	+16.5	---	77
		8056	+32.5	+21.5	62	---
			+37.5	+19.5	62	---
		8054	+45.0	−29.5	---	108
			+48.5	−27.5	---	62
24	11 56	8059	−51.0	−17.5	---	216
		8058	− 9.5	+12.0	---	108
			− 6.0	+12.0	---	46
			+ 0.5	+12.0	108	---
		8055	+30.5	+20.5	---	62
			+32.5	+17.0	---	185
		8056	+47.0	+22.0	31	---
			+51.0	+19.5	93	---
		8054	+57.0	−29.5	62	---
			+63.0	−27.0	---	31
27	11 56	8063	−64.0	−21.5	93	---
		8062	−50.5	−20.5	---	123
		8059	−15.0	−17.0	---	62
			−12.0	−17.5	---	170
		8058	+30.0	+12.5	---	9
			+38.0	+13.0	---	108
		8055	+71.0	+20.0	154	---
			+73.0	+17.0	401	---
30	11 55	8069	−73.5	−19.0	---	77
		8067	−68.0	−17.5	46	---
			−63.0	−18.0	---	93
		8066	−47.5	−22.0	---	15
		8063	−23.5	−21.5	71	---
		8062	−13.0	−21.0	---	185
			− 7.5	−19.5	---	216
		8059	+28.0	−18.0	---	154
		8068	+44.0	+23.5	56	---
			+49.0	+22.5	40	---
May 1	12 8	8070	−67.0	+14.5	6	---
		8069	−61.5	−19.0	93	---
		8067	−55.5	−17.5	---	31
			−49.0	−18.0	---	108
		8066	−34.5	−22.5	---	25
		8063	−10.5	−21.5	37	---
		8062	− 1.0	−21.0	---	154
		8065	+ 7.5	−19.5	---	185
		8059	+41.0	−18.5	---	93
		8068	+57.0	+24.0	25	---
			+62.0	+22.5	31	---
2	11 57	8069	−48.0	−20.0	77	---
		8067	−37.5	−17.5	---	123
		8066	−23.0	−22.5	31	---
		8063	+ 2.5	−21.5	46	---
		8062	+11.0	−21.0	---	139

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
May 2	11 57	8065	+18.5	−22.5	---	123
			+20.5	−19.5	---	154
		8059	+55.0	−18.5	62	---
		8068	+72.0	+22.5	62	---
3	11 57	8072	−61.0	+20.0	9	---
		8069	−34.5	−20.0	46	---
		8067	−27.0	−18.0	---	46
			−22.0	−17.5	---	123
		8063	+15.0	−21.5	31	---
		8062	+27.0	−22.0	---	154
		8065	+33.0	−20.0	---	93
			+34.5	−22.5	---	139
		8059	+68.5	−18.5	93	---
10	11 52	8078	−48.0	−17.0	---	31
		8076	−43.5	+12.5	15	---
			−38.0	+10.0	31	---
			−35.0	+10.5	231	---
		8073	−12.0	+19.5	108	---
		8075	+2.0	−11.5	---	46
			+7.5	−11.0	123	---
		8069	+57.5	−19.5	31	---
		8067	+74.0	−17.0	93	---
11	12 0	8078	−76.0	−16.5	46	---
			−34.0	−16.5	---	123
		8076	−22.0	+10.0	---	309
		8073	+1.5	+19.5	123	---
		8075	+15.5	−12.0	---	6
			+20.5	−11.5	108	---
12	12 10	8080	−61.0	−28.0	---	31
		8078	−24.0	−17.5	---	93
			−18.0	−16.5	---	154
		8076	−8.0	+10.0	262	---
		8073	+13.5	+19.5	108	---
		8075	+33.5	−11.0	---	62
14	11 55	8083	−61.5	+15.0	9	---
		8082	−49.0	+17.5	15	---
		8080	−40.0	−29.0	---	15
			−36.0	−28.0	---	93
		8081	−3.5	+10.5	---	31
			+1.0	+10.0	---	46
		8078	+2.0	−17.0	---	93
			+9.5	−16.0	139	---
		8079	+6.0	−12.5	9	---
		8076	+18.5	+10.0	247	---
		8073	+40.5	+19.5	77	---
		8075	+61.0	−11.0	31	---
15	11 57	8085	−53.5	+7.0	---	108
		8082	−36.0	+17.5	---	46
		8080	−29.5	−29.0	22	---
			−22.5	−28.5	---	93
		8081	+10.0	+10.5	---	46
			+14.5	+9.5	---	62
		8078–79	+15.5	−17.0	---	37
			+18.0	−19.5	---	62
			+19.5	−21.0	---	77
			+20.0	−13.0	6	---
			+22.5	−17.0	154	---
		8076	+32.0	+9.5	278	---
		8073	+52.5	+19.0	93	---
1917	h m		°	°		
May 16	12 7	851d	−64.5	+15.0	---	15
		8085	−38.0	+8.0	---	278
		8082	−21.0	+19.5	15	---
		8080	−11.0	−26.5	---	9
			−6.0	−26.0	---	12
		8081	+24.0	+11.0	---	25
			+30.0	+10.5	46	---
		8078–79	+28.5	−15.5	15	---
			+30.5	−20.5	---	31
			+32.0	−17.5	---	77
			+35.0	−18.0	---	93
			+36.5	−15.0	139	---
		8076	+45.0	+10.0	216	---
		8073	+65.0	+19.5	108	---
18	11 56	8087	−40.0	+11.0	---	46
			−36.5	+10.5	154	---
			−32.5	+10.0	40	---
		8086	−17.5	−18.0	---	15
		8085	−14.5	+7.0	---	93
			−8.0	+6.5	---	108
		8088	−7.5	+20.5	---	46
		8084	−7.0	+16.0	---	31
		8082	+5.5	+20.0	---	31
		8081	+57.0	+10.0	46	---
		8079	+59.0	−18.0	---	154
		8078	+62.0	−15.0	123	---
		8076	+72.0	+10.0	185	---
19	11 56	8087	−26.0	+10.5	---	154
			−20.0	+10.0	---	93
		8086	−2.0	−17.5	---	62
		8085	−1.5	+7.0	---	93
			+5.5	+6.5	---	93
		8088	+7.0	+20.0	---	370
		8081	+68.5	+10.5	77	---
		8079	+71.0	−18.0	---	93
		8078	+77.0	−14.5	---	139
22	11 52	8089	−80.0	−22.5	---	123
		8087	+15.0	+11.0	---	154
			+21.0	+10.0	---	62
		8086	+34.0	−16.0	---	62
			+40.0	−16.0	---	77
		8085	+42.5	+7.5	---	46
		8088	+43.5	+21.5	62	---
			+45.5	+19.5	---	185
		8083	+52.0	+19.0	---	154
23	11 57	8093	−82.0	+16.0	62	---
			−70.5	+18.0	---	154
		8092	−71.0	+7.5	---	185
		8089	−69.0	−22.5	---	93
			−62.5	−23.5	139	---
		8091	−48.0	−19.0	---	31
		8087	+30.5	+11.0	---	154
		8086	+48.0	−17.5	---	77
			+54.5	−15.0	6	---
		8088	+57.5	+19.5	---	123
			+62.0	+19.0	---	46
		8090	+63.0	−18.5	---	6
		8083	+63.5	+17.5	77	---
			+69.5	+19.0	---	93

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
May 24	11 55	8095	−74.0	−5.0	---	185
		8093	−66.5	+16.0	62	---
			−58.0	+18.0	154	---
		8092	−57.5	+7.0	---	185
		8089	−55.5	−23.5	---	123
			−48.5	−24.0	216	---
		8094	−4.0	−22.0	---	46
		8087	+42.0	+10.5	---	93
			+49.0	+10.0	31	---
		8086	+60.0	−17.5	---	6
		8088	+70.5	+19.5	---	93
		8090	+74.5	−20.0	77	---
			+79.0	−19.5	123	---
26	11 58	8099	−67.5	−6.5	93	---
		8097	−67.0	−15.0	---	154
			−65.0	−12.5	---	123
		8095	−46.5	−4.0	139	---
		8093	−40.5	+16.5	31	---
			−32.0	+17.5	93	---
		8092	−33.5	+7.5	---	46
			−28.5	+7.0	---	93
		8089	−28.5	−23.5	---	278
			−22.5	−24.0	278	---
		8094	+25.5	−21.0	---	77
		8098	+39.5	+9.5	---	22
		8096	+54.0	+10.5	6	---
June 1	11 54	8103	−63.0	−22.0	108	---
		8101	−9.0	−20.0	---	62
			−2.5	−16.5	139	---
		8099	+14.5	−5.5	---	108
		8097	+15.0	−16.0	---	216
		8095	+36.0	−6.0	---	293
		8093	+38.0	+15.5	15	---
			+47.0	+16.0	46	---
			+42.5	−17.0	31	---
		8089	+45.0	−24.5	---	15
			+56.0	−24.5	185	---
4	11 57	8106	−78.0	−10.0	154	---
		8104	−60.0	+9.0	185	---
		8103	−24.5	−22.0	108	---
		8105	−16.5	−10.0	---	31
		8101	+37.0	−17.0	201	---
		8097	+55.0	−16.5	---	185
		8099	+56.0	−6.0	77	---
		8095	+75.0	−6.0	---	309
6	12 5	8106	−51.0	−10.5	---	123
		8104	−33.5	+9.0	123	---
		8103	−0.5	−21.5	---	6
			+2.0	−22.5	93	---
		8105	+13.0	−9.0	---	62
		8101	+63.0	−17.0	123	---
		8099	+81.0	−7.5	123	---
		8097	+85.0	−16.0	---	185
9	11 58	8112	−73.5	+4.5	---	93
		8111	−70.0	−15.0	278	---
		8108	−69.0	+19.5	77	---
			−63.0	+20.5	---	216
			−60.0	+17.5	---	139
		8107	−58.0	−25.0	9	---
			−50.5	−26.0	---	46
		8106	−9.0	−11.5	---	62
1917	h m		°	°		
June 9	11 58	8104	+5.0	+9.0	93	---
		8109	+10.5	+15.0	---	15
		8103	+40.5	−22.0	93	---
			+42.0	−23.0	---	9
		8105	+51.5	−8.5	---	46
			+57.0	−9.5	123	---
12	12 7	8114	−68.5	−19.0	---	154
			−62.0	−19.5	---	93
		8111	−38.0	−18.0	---	15
			−37.5	−15.5	---	46
			−30.5	−15.0	185	---
		8112	−34.0	+6.5	---	77
			−31.0	+7.5	---	22
		8108	−28.0	+21.0	---	77
			−23.5	+18.0	---	77
			−21.5	+20.5	---	93
		8107	−10.5	−25.0	31	---
		8106	+32.5	−11.5	---	62
		8104	+44.5	+10.0	77	---
		8109	+51.0	+15.0	---	31
			+57.0	+14.5	123	---
		8103	+70.0	−22.0	93	---
16	11 56	8121	−62.0	+10.0	46	---
		8119	−50.5	+9.0	---	139
		8120	−41.0	+13.0	---	93
			−36.0	+11.5	108	---
		8123	−38.0	+19.0	---	31
		8114	−20.0	−19.5	46	---
			−9.0	−19.0	---	46
		8111	+17.5	−17.0	---	31
			+22.0	−14.0	---	139
		8117	+23.5	−3.0	---	62
		8112	+27.5	+8.0	---	6
		8108	+28.0	+18.0	---	247
		8107	+37.5	−28.0	---	6
		8122	+52.0	−28.5	---	15
18	11 55	8124	−62.5	+12.0	278	---
		8119	−24.0	+10.0	154	---
		8120	−17.0	+14.0	---	247
			−9.0	+12.0	---	216
		8123	−14.0	+19.5	---	25
			−9.5	+18.5	77	---
		8114	+6.0	−19.5	---	40
			+18.0	−18.5	46	---
		8111	+47.5	−14.0	---	170
		8117	+48.0	−3.0	9	---
			+55.5	−3.0	---	31
		8108	+50.0	+20.5	77	---
			+55.0	+18.5	---	201
		8112	+54.5	+9.5	---	93
19	11 52	8126	−74.0	−9.0	123	---
		8125	−72.0	−25.0	185	---
		8124	−49.0	+12.0	324	---
		8119	−10.0	+10.0	123	---
			−8.0	+8.5	---	15
		8120	−3.0	+14.0	---	154
			+4.5	+12.0	---	216
		8123	+0.5	+19.0	---	9
			+3.5	+18.0	77	---
		8114	+19.0	−19.5	31	---
			+30.5	−18.5	40	---
		8111	+60.5	−15.0	---	170

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
June 19	11 52	8108	+62.5	+21.0	93	---
			+69.0	+18.0	---	216
		8112	+67.5	+10.0	---	201
		8117	+68.5	− 3.5	46	---
20	11 51	8126	−61.5	− 9.0	123	---
		8125	−59.0	−25.0	170	---
		8124	−37.0	+12.0	278	---
		8119	+ 5.0	+ 8.5	---	154
		8120	+10.5	+14.0	---	139
			+18.5	+12.0	---	201
		8123	+17.0	+17.5	77	---
		8114	+32.0	−19.5	15	---
			+44.5	−18.5	40	---
		8111	+74.0	−15.0	108	---
		8112	+77.0	+10.0	62	---
21	11 59	8128	−69.0	+17.0	31	---
		8127	−63.0	+ 9.0	31	---
		8126	−48.5	− 9.0	93	---
		8125	−47.0	−25.0	185	---
		8124	−23.0	+12.5	309	---
		8119	+18.5	+ 8.5	---	123
		8120	+22.5	+13.5	---	93
			+31.5	+11.0	---	123
			+23.5	+20.0	---	15
		8123	+29.0	+17.5	46	---
		8114	+45.0	−19.5	15	---
			+58.0	−19.0	46	---
22	11 51	8128	−56.0	+17.5	6	---
		8127	−52.5	+ 9.0	---	108
		8126	−35.5	− 9.0	93	---
		8125	−33.5	−25.0	170	---
		8124	− 9.0	+12.0	247	---
		8119	+30.5	+10.0	108	---
		8120	+35.0	+13.5	77	---
			+37.5	+12.0	---	31
			+44.0	+11.0	---	108
		8123	+42.0	+17.5	37	---
		8114	+70.0	−19.0	31	---
23	11 52	8129	−74.0	+17.5	---	401
		8127	−38.5	+ 9.0	---	93
		8126	−22.0	− 9.0	---	123
		8125	−20.5	−25.0	139	---
		8124	+ 3.5	+12.0	309	---
		8119	+42.5	+ 9.5	77	---
			+45.0	+ 6.0	6	---
		8120	+48.0	+14.0	77	---
		8123	+54.5	+18.0	---	31
			+57.0	+11.0	---	93
25	11 58	8129	−49.0	+17.5	---	370
		8131	−19.5	− 9.5	---	31
		8127	−13.5	+10.0	---	154
			− 8.0	+ 9.0	---	93
		8126	+ 4.5	− 9.5	108	---
		8125	+ 5.5	−25.5	154	---
		8124	+31.0	+12.0	---	278
		8119	+69.0	+10.0	46	---
26	11 54	8135	−45.0	+ 9.5	---	46
		8129	−37.0	+17.5	---	247
		8132	−36.5	−22.0	---	46

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
June 26	11 54	8134	− 7.5	+ 4.5	15	---
		8127	+ 1.0	+10.0	---	185
			+ 7.5	+ 7.5	123	---
		8126	+18.5	− 9.5	108	---
		8125	+19.0	−25.5	139	---
		8124	+43.5	+12.0	247	---
27	11 57	8136	−65.0	+10.5	31	---
		8139	−57.5	−20.5	---	62
		8135	−30.0	+10.0	15	---
		8129	−23.5	+17.5	---	216
		8132	−22.5	−22.0	---	31
		8134	+ 8.0	+ 5.0	15	---
		8127	+11.5	+11.0	---	139
			+18.0	+ 9.0	---	154
		8133	+18.5	−22.0	---	31
		8126	+31.0	− 9.0	108	---
		8125	+31.0	−24.0	185	---
		8124	+58.0	+13.5	247	---
			+70.0	+12.0	---	62
30	11 51	8141	−79.0	−14.0	93	---
		8139	−18.5	−21.0	---	46
		8129	+17.0	+18.5	---	154
		8127	+51.5	+11.0	---	93
		8133	+61.5	−21.0	108	---
		8125	+68.0	−25.0	123	---
		8126	+70.5	− 9.5	123	---
July 2	11 55	8140	−49.0	+10.0	31	---
		8141	−49.0	−15.5	---	247
		8142	−36.0	−14.0	---	93
		8139	+ 8.0	−21.0	---	62
			+15.5	−18.5	---	15
		8129	+42.5	+18.5	---	93
		8127	+77.0	+11.0	62	---
6	11 58		−74.0	+14.0	---	46
		8145	−63.5	+13.0	15	---
			−59.0	+12.5	9	---
		8144	−57.5	+ 7.5	15	---
		8146	−23.0	−20.5	---	15
		8141	+ 2.5	−17.5	---	401
		8140	+ 6.5	+10.0	---	46
			+16.0	− 8.5	6	---
		8142	+21.0	−15.5	139	---
		8143	+28.0	+18.0	---	31
		8139	+62.0	−21.0	46	---
7	11 37	8149	−78.0	+18.0	216	---
		8148	−67.0	+ 7.5	---	15
			−63.0	+ 8.0	---	31
			−60.0	+ 8.5	6	---
		8144	−44.5	+ 8.0	---	9
		8147	−42.5	+18.5	---	31
		8146	− 9.0	−20.5	---	46
		8141	+15.5	−17.5	---	340
		8140	+18.5	+12.0	---	62
		8142	+34.0	−14.0	108	---
		8143	+44.0	+20.0	---	15
10	11 56	8153	−79.0	+ 9.5	46	---
		8151	−48.0	+22.0	---	340
		8149	−43.0	+17.5	---	432
			−37.0	+18.0	154	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
July 10	11 56	8150	−40.0	+10.0	---	31
			−34.0	+ 8.0	154	---
		8148	−27.5	+ 8.5	---	46
			−20.5	+ 8.5	---	93
		8146	+32.5	−20.0	---	185
		8141	+58.0	−17.0	---	77
		8140	+58.5	+12.0	---	123
		8142	+75.0	−14.5	123	---
12	11 56	8153	−51.5	+10.0	---	46
		8152	−43.5	+16.0	15	---
		8156	−42.5	+ 7.5	---	15
			−41.0	+10.5	31	---
		8155	−29.0	+13.0	---	15
		8151	−22.0	+21.5	---	278
		8149	−14.0	+17.5	---	679
		8150	−10.0	+ 8.0	---	216
		8148	+ 4.0	+ 8.5	---	15
			+10.5	+ 8.0	77	---
		8144	+26.0	+ 4.0	3	---
			+29.5	+ 8.0	---	6
		8146	+60.5	−21.0	---	123
14	12 4	8161	−77.5	+13.0	154	---
		8160	−66.0	−18.5	46	---
		8158	−39.0	+13.5	---	62
		8153	−24.5	+ 9.5	---	6
		8156	−13.0	+ 9.5	---	46
		8151	+ 3.5	+21.0	---	247
		8149	+ 8.0	+18.5	---	216
			+14.0	+17.5	---	432
		8150	+14.5	+ 9.5	---	31
			+19.0	+ 7.5	139	---
		8148	+40.0	+ 6.0	93	---
		8157	+46.5	−11.0	---	77
		8144	+47.0	+ 4.0	15	---
		8146	+85.0	−21.0	62	---
16	11 58	8163	−81.0	−23.5	77	---
		8162	−77.5	+12.5	123	---
		8161	−51.0	+13.0	154	---
		8160	−39.5	−17.5	46	---
			−38.0	−19.5	---	46
		8158	−15.0	+14.5	---	15
			−10.0	+14.5	---	15
		8153	+ 2.0	+10.5	---	25
		8156	+14.5	+ 9.5	37	---
			+15.5	+ 6.0	22	---
		8151	+32.5	+21.0	---	216
		8149	+42.0	+18.0	---	370
		8150	+45.0	+ 7.5	108	---
		8148	+66.0	+ 6.0	77	---
		8157	+70.0	−11.5	---	123
17	11 56	8163	−67.0	−23.5	62	---
		8162	−63.5	+12.5	93	---
		8161	−37.5	+13.0	139	---
		8160	−27.0	−17.5	46	---
			−23.5	−19.5	---	31
		8158	− 2.0	+15.0	---	31
		8156	+29.5	+ 8.5	---	46
		8151	+44.0	+21.5	---	185
		8149	+54.0	+17.5	370	---
		8150	+58.0	+ 7.5	123	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
July 20	11 55	8167	−82.0	+ 8.0	---	123
		8163	−29.5	−23.0	62	---
		8162	−27.0	+12.0	---	93
		8164	− 4.0	−12.5	---	15
		8161	+ 1.5	+13.5	139	---
21	12 19	8168	−82.0	−15.5	---	154
		8163	−16.0	−23.5	62	---
		8162	−12.5	+12.0	---	93
		8164	+12.0	−12.5	6	---
		8161	+15.5	+13.5	139	---
		8166	+70.5	+ 9.5	---	15
24	11 57	8169	−61.0	+14.0	---	278
		8168	−45.0	−18.0	---	123
			−38.5	−15.0	---	123
		8167	−27.5	+ 9.0	---	154
		8163	+23.0	−23.5	46	---
		8162	+27.5	+12.0	77	---
		8161	+54.0	+13.5	139	---
27	12 14	8173	−84.0	+ 6.5	108	---
			−82.0	+ 4.5	77	---
		8170	−56.0	+13.0	6	---
			−52.0	+13.0	123	---
		8169	−23.5	+14.0	---	247
		8171	−15.0	−15.0	---	31
			− 8.0	−17.0	---	93
		8168	+ 0.5	−17.0	---	185
		8167	+13.5	+ 9.5	---	62
		8163	+62.5	−23.5	93	---
		8162	+67.5	+12.0	62	---
28	11 47	8173	−70.0	+ 6.5	62	---
			−68.0	+ 4.5	77	---
		8170	−47.5	+17.5	---	31
			−38.0	+13.0	62	---
		8169	−19.0	+14.0	---	46
			−13.5	+14.0	62	---
			− 8.0	+13.5	---	185
		8171	− 2.5	−16.5	---	62
			+ 3.0	−17.0	---	154
		8168	+11.5	−18.0	---	31
			+13.0	−14.5	---	185
		8167	+26.5	+ 9.5	---	31
		8162	+80.0	+12.0	---	62
30	11 56		−53.0	+21.5	6	---
		8176	−49.5	−13.0	---	31
		8173	−45.5	+ 7.5	31	---
			−43.0	+ 4.5	31	---
		8175	−22.0	+20.5	12	---
		8170	−13.0	+14.0	---	31
		8174	− 2.0	+ 8.5	---	15
			+ 4.0	+ 8.0	---	46
		8172	+ 5.5	+15.0	---	31
		8169	+14.5	+14.5	---	185
		8171	+21.0	−15.0	139	---
			+29.5	−14.5	---	216
		8168	+40.5	−14.0	---	139
		8167	+54.0	+ 9.5	---	93
Aug. 2	11 59	8177	−40.0	+18.0	77	---
		8179	−10.5	−28.0	---	31
		8173	− 4.5	+ 4.5	---	46

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Aug. 2	11 59	8170	+21.0	+13.0	---	62
		8175	+22.5	+21.5	---	46
		8174	+47.0	+ 8.0	31	---
		8169	+59.5	+13.5	247	---
		8171	+61.0	−15.0	---	93
			+70.0	−15.5	---	309
3	12 7	8181	−85.0	+15.0	---	617
			−82.5	+19.5	494	---
			−69.0	+15.0	62	---
		8180	−68.0	−23.5	154	---
		8177	+25.5	+16.0	77	---
			− 5.5	−10.0	---	31
		8179	+ 2.5	−27.5	---	62
		8173	+ 9.5	+ 3.5	---	31
		8170	+31.5	+13.0	15	---
			+38.0	+12.5	---	15
		8175	+37.5	+22.0	---	77
		8174	+57.5	+ 9.5	46	---
			+63.0	+ 7.5	123	---
		8172	+63.5	+16.0	31	---
		8169	+69.0	+13.5	---	216
		8171	+77.0	−16.0	31	---
			+83.0	−16.0	---	309
4	11 51	8184	−78.5	−11.5	123	---
		8181	−74.0	+15.0	---	864
			−73.0	+10.5	---	154
			−69.0	+18.5	370	---
		8180	−57.0	−23.5	154	---
		8183	−56.0	+13.0	---	123
		8177	−12.0	+15.5	93	---
		8179	+16.0	−27.5	---	46
		8173	+23.5	+ 2.0	15	---
		8175	+48.0	+22.0	---	62
		8178	+66.0	−14.5	15	---
		8171	+70.0	+ 9.5	46	---
			+77.5	+ 7.0	93	---
		8169	+83.0	+13.5	---	309
6	12 4	8194	−85.0	+12.0	154	---
		8193	−78.0	+ 9.0	108	---
		8192	−66.0	−13.5	46	---
		8188	−62.0	+ 2.0	---	216
		8184	−58.0	−12.0	---	77
			−51.5	−11.5	123	---
		8191	−55.0	+19.5	---	46
		8181	−46.0	+15.0	---	926
			−45.5	+10.5	---	154
			−43.0	+18.5	340	---
		8180	−31.5	−23.0	139	---
		8183	−27.0	+12.5	---	108
		8190	− 4.0	+ 4.0	---	31
		8187	− 2.0	−23.0	---	62
		8177	+15.5	+13.5	---	93
		8189	+27.5	0.0	---	31
		8179	+44.0	−27.0	---	15
		8182	+49.0	−16.0	31	---
		8186	+64.0	+13.0	---	93
8	12 3	8199	−78.0	−17.5	154	---
		8194	−60.0	+11.5	123	---
		8197	−54.0	+16.0	31	---
		8193	−52.0	+ 9.0	---	123
		8188	−33.5	+ 1.5	---	77
1917	h m		°	°		
Aug. 8	12 3	8184	−29.5	−12.0	---	154
			−24.0	−11.5	139	---
		8191	−29.0	+19.5	---	93
		8181	−19.0	+16.0	---	1944
			−18.0	+10.5	---	185
		8195	−10.5	−17.5	---	123
		8180	− 6.5	−23.0	123	---
		8183	− 1.5	+13.5	---	93
			+ 1.0	− 6.0	15	---
			+ 8.5	−25.0	31	---
		8187	+26.0	−23.0	---	123
		8177	+42.5	+13.5	---	123
		8189	+52.5	+ 0.5	---	46
			+58.0	− 0.5	139	---
9	11 57	8199	−69.0	−18.5	108	---
			−62.0	−17.5	154	---
		8194	−47.0	+12.0	---	108
		8197	−40.0	+16.0	---	6
		8193	−37.5	+ 8.0	---	123
		8201	−32.0	+15.5	---	15
		8188	−20.0	+ 1.5	---	62
		8191	−19.0	+19.5	---	31
			−14.0	+19.5	---	46
		8184	−17.0	−12.0	---	46
			−11.0	−11.5	---	154
		8181	− 8.0	+17.0	---	648
			− 7.5	+13.0	---	586
			− 4.0	+20.0	247	---
			− 3.5	+ 9.5	---	154
			− 1.0	+13.5	---	309
		8195	+ 4.5	−16.0	---	154
		8180	+ 7.5	−23.0	108	---
		8183	+ 9.5	+14.5	---	46
			+12.0	+12.0	---	46
		8187	+41.0	−23.0	62	---
		8177	+57.5	+13.5	93	---
		8198	+68.0	−19.0	---	46
		8189	+71.0	− 0.5	---	154
10	12 7	8203	−83.0	+17.0	185	---
		8202	−67.5	−13.5	62	---
		8199	−58.0	−18.5	---	154
			−49.5	−17.5	139	---
		8194	−32.0	+11.0	---	108
		8193	−22.0	+ 7.5	---	154
		8201	−19.0	+14.5	---	108
		8188	− 7.5	+ 1.5	---	46
		8184	− 5.0	−12.5	---	15
			+ 1.5	−11.5	---	154
		8191	− 1.0	+19.0	---	46
		8181	+ 6.0	+17.5	---	864
			+ 9.5	+12.5	---	710
			+10.0	+10.0	---	154
		8180	+20.5	−23.0	108	---
		8195	+14.5	−17.5	---	62
			+20.5	−14.0	---	216
		8183	+28.0	+12.5	15	---
		8187	+52.5	−22.5	62	---
		8177	+68.5	+15.0	62	---
		8189	+85.0	+ 1.0	---	185
11	12 2	8203	−70.0	+17.0	123	---
		8202	−55.0	−13.5	46	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Aug. 11	12 2	8199	−42. 5	−18. 5	---	108
			−37. 0	−17. 5	123	---
		8194	−18. 0	+10. 5	---	154
		8193	− 7. 5	+ 7. 5	---	93
		8201	− 6. 0	+14. 5	---	123
		8188	+ 7. 0	+ 1. 5	---	31
		8184	+17. 0	−12. 0	139	---
		8181	+19. 0	+16. 0	---	895
			+22. 0	+12. 5	---	617
			+22. 5	+ 9. 5	77	---
		8180	+32. 0	−23. 5	93	---
		8195	+28. 0	−17. 0	---	31
			+33. 5	−15. 5	---	93
			+38. 0	−15. 0	170	---
		8183	+41. 5	+13. 0	15	---
		8177	+85. 0	+15. 0	---	62
13	11 57	8208	−75. 0	−11. 0	77	---
		8205	−74. 5	+ 7. 5	---	123
			−76. 5	+ 7. 5	---	340
		8207	−78. 0	−23. 0	123	---
		8203	−44. 0	+17. 0	77	---
		8202	−29. 0	−13. 5	---	31
		8206	−26. 0	−18. 5	---	15
		8199	−18. 0	−19. 5	---	62
			−17. 0	−18. 5	---	31
			−10. 5	−17. 5	170	---
		8194	+ 8. 0	+12. 0	---	247
		8201	+20. 0	+15. 0	---	309
		8193	+21. 5	+ 8. 0	---	31
		8188	+32. 5	+ 0. 5	---	12
		8184	+42. 5	−11. 5	123	---
		8181	+46. 0	+17. 0	---	1420
			+48. 0	+10. 5	46	---
		8195	+53. 0	−17. 0	108	---
			+57. 5	−16. 0	---	62
			+63. 5	−15. 0	---	556
		8180	+58. 0	−23. 5	108	---
14	11 59	8205	−61. 0	+ 7. 5	---	123
			−52. 5	+ 8. 0	340	---
		8208	−60. 5	−11. 0	77	---
		8207	−60. 0	−24. 0	31	---
			−57. 5	−27. 0	---	123
			−56. 0	−23. 5	216	---
		8203	−30. 5	+17. 5	108	---
		8202	−14. 5	−13. 0	31	---
		8206	− 8. 0	−19. 0	---	93
		8199	+ 2. 5	−17. 5	154	---
		8194	+22. 5	+12. 0	---	278
		8201	+33. 0	+14. 5	---	309
		8193	+36. 0	+ 8. 0	---	31
		8188	+47. 5	+ 0. 5	---	46
		8184	+57. 5	−11. 5	185	---
		8181	+60. 0	+17. 0	---	1389
		8209	+61. 5	+10. 0	---	62
		8195	+67. 5	−17. 5	---	108
			+77. 0	−15. 0	---	432
		8180	+71. 5	−24. 0	154	---
15	11 55		−40. 5	−21. 5	---	15
		8208	−35. 0	−11. 0	62	---
		8207	−32. 5	−26. 5	---	185
			−27. 5	−22. 5	340	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Aug. 16	11 55	8205	−28. 0	+ 8. 0	---	340
			−21. 5	+ 7. 5	46	---
		8210	− 8. 0	−24. 0	---	46
		8203	− 6. 0	+17. 5	77	---
			+10. 0	+20. 5	---	6
		8202	+11. 0	−12. 5	9	---
		8199	+28. 5	−17. 5	139	---
		8194	+47. 5	+12. 0	---	62
			+54. 5	+14. 5	123	---
		8201	+63. 0	+16. 0	---	309
		8181	+81. 0	+15. 5	247	---
		8184	+90. 0	−10. 0	309	---
17	12 3	8213	−78. 0	+13. 0	---	370
		854t	−57. 0	+27. 5	---	6
		8208	−21. 0	−11. 0	46	---
		8207	−18. 5	−27. 0	---	185
			−13. 0	−22. 5	370	---
		8205	−15. 0	+ 8. 0	---	340
			− 8. 0	+ 7. 0	31	---
		8211	+ 2. 0	+28. 5	---	15
		8210	+ 4. 0	−24. 5	---	15
		8203	+ 7. 5	+17. 5	46	---
		8199	+41. 5	−17. 5	139	---
			+50. 5	+ 2. 0	---	6
		8194	+60. 5	+11. 5	---	46
			+67. 5	+13. 5	123	---
		8201	+74. 0	+15. 0	---	216
18	11 59	8213	−68. 0	+13. 0	---	154
			−63. 0	+12. 5	340	---
		8208	− 8. 5	−10. 5	46	---
		8207	− 7. 5	−28. 0	---	123
			− 3. 5	−22. 5	---	463
		8205	− 3. 0	+ 8. 0	278	---
			+ 3. 5	+ 7. 5	---	123
		8210	+16. 0	−25. 5	---	31
		8203	+20. 0	+18. 0	93	---
		8199	+55. 0	−18. 0	247	---
20	11 54	8214	−64. 0	+13. 0	---	15
		8213	−44. 0	+13. 0	---	46
			−37. 5	+12. 0	278	---
		8207	+18. 0	−27. 5	---	108
			+23. 5	−23. 0	---	401
		8208	+19. 0	−10. 5	40	---
		8205	+25. 0	+ 8. 0	278	---
			+34. 5	+ 6. 0	31	---
		8210	+37. 5	−27. 0	62	---
			+43. 0	−24. 5	77	---
		8203	+46. 0	+17. 0	62	---
		8202	+64. 0	−17. 0	62	---
			+70. 0	−17. 0	123	---
		8199	+82. 0	−18. 0	154	---
21	12 6	8216	−80. 0	+15. 5	15	---
		8215	−73. 5	−18. 5	---	278
		8213	−31. 0	+12. 5	---	15
			−23. 0	+12. 0	278	---
		8208	+31. 5	−11. 5	---	31
		8207	+32. 5	−28. 0	---	46
			+35. 5	−23. 5	---	432

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Aug. 21	12 6	8205	+41.0	+ 8.0	---	247
			+49.5	+ 7.0	31	---
		8210	+50.0	−26.5	19	---
			+57.5	−24.0	93	---
		8203	+59.0	+17.5	77	---
		8202	+79.0	−17.0	---	62
22	12 7	8216	−73.5	+15.5	---	46
			−66.0	+15.0	15	---
		8215	−72.0	−17.5	31	---
			−66.0	−17.5	46	---
			−60.5	−18.0	---	309
		8213	−19.5	+12.5	---	15
			−10.0	+12.0	278	---
			−12.5	−19.5	---	15
		8217	+13.5	−12.0	---	15
		8207	+43.0	−29.0	---	31
			+48.0	−23.5	---	401
		8208	+45.0	−11.5	---	31
		8205	+53.0	+ 7.5	---	340
			+62.5	+ 5.5	15	---
		8210	+63.0	−27.0	---	31
			+70.5	−24.0	15	---
		8203	+71.5	+17.0	62	---
24	11 56	8219	−64.5	−12.0	---	31
			−63.5	−15.5	15	---
		8215	−46.0	−18.0	---	46
			−37.5	−18.0	---	154
			−32.5	−18.0	262	---
		8216	−42.0	+17.5	---	15
		8213	+17.0	+12.0	---	216
		8205	+78.0	+ 7.5	185	---
		8207	+78.0	−24.0	216	---
25	12 6	8221	−73.0	− 0.5	123	---
		8219	−51.0	−12.5	---	31
		8216	−29.5	+16.0	---	31
		8215	−25.0	−18.0	---	123
			−18.0	−18.0	278	---
		8222	−11.0	+17.0	---	31
		8213	+29.5	+12.0	---	216
27	11 47	8226	−70.5	+ 4.5	---	93
		8221	−46.5	− 0.5	93	---
		8224	−16.5	+13.5	---	31
		8215	+ 3.0	−17.5	---	93
			+ 8.0	−18.0	309	---
		8222	+13.5	+16.0	---	77
			+18.0	+18.5	---	62
		8213	+55.0	+12.0	---	185
28	11 47	8226	−57.5	+ 4.5	---	31
		8225	−41.0	−28.0	---	31
			−39.0	−23.5	---	40
		8221	−32.0	− 0.5	62	---
		8224	− 7.0	+16.0	15	---
			− 2.0	+13.0	31	---
		8216	+12.0	+14.5	---	31
		8215	+15.0	−18.0	---	77
			+21.0	−18.5	247	---
		8222	+27.5	+15.5	---	62
			+31.0	+18.0	46	---
		8213	+69.0	+11.5	247	---
1917	h m		°	°		
Aug. 29	11 49	8228	−85.0	−15.0	370	---
		8227	−71.0	+24.5	31	---
		8226	−43.5	+ 4.0	---	15
		8221	−19.5	− 0.5	46	---
			+ 0.5	+ 8.5	---	31
		8224	+ 8.0	+14.5	---	31
		8216	+27.0	+15.0	31	---
		8215	+31.0	−18.0	---	309
		8222	+40.0	+16.5	---	15
			+45.0	+18.5	31	---
		8213	+86.0	+12.0	247	---
Sept. 4	12 0		−70.5	− 8.5	---	62
		8238	−48.5	+16.0	---	123
			−48.0	− 1.0	---	15
		8235	−47.0	−14.0	---	62
		8231	−31.0	+18.0	---	15
			−22.0	+18.0	---	93
		8230	−21.0	−11.0	93	---
		8228	− 8.0	−17.0	---	77
			− 0.5	−16.0	123	---
			+11.5	−13.5	6	---
			+17.5	+ 1.5	6	---
			+29.0	+30.0	22	---
		8225	+49.5	−27.5	---	77
			+53.5	−25.0	---	46
		8236	+61.5	+ 4.0	---	31
		8229	+66.5	−18.5	---	108
			+74.0	−18.0	---	247
10	11 54	8247	−67.5	−26.0	77	---
		8244	−57.5	+ 7.5	108	---
			−53.0	+ 9.5	9	---
		8243	−37.0	+ 9.5	---	31
		8242	−17.5	+11.0	---	46
		8239	− 4.0	−19.0	62	---
		8238	+32.0	+17.0	---	46
			+35.0	+ 3.5	15	---
		8246	+55.5	−22.5	31	---
		8230	+59.0	−11.0	62	---
11	11 58	8247	−55.0	−26.0	46	---
		8244	−43.5	+ 7.5	108	---
		8243	−23.0	+ 9.5	---	93
		8242	− 3.5	+10.5	---	62
		8239	+ 9.5	−19.0	62	---
		8249	+22.0	−26.0	---	31
		8238	+43.0	+17.0	31	---
			+48.5	+17.0	46	---
		8248	+59.5	+ 9.0	---	46
		8230	+72.0	−11.0	62	---
12	12 0	8250	−77.0	+23.5	494	---
		8247	−41.0	−26.0	---	46
		8244	−30.5	+ 7.5	93	---
		8243	− 9.0	+10.0	---	154
		8242	+ 7.5	+10.5	15	---
			+12.0	+10.5	25	---
		8239	+22.0	−19.0	31	---
		8249	+37.5	−26.0	---	201
13	12 0	8252	−83.0	−13.0	---	463
		8250	−63.0	+24.0	432	---
		8244	−17.5	+ 7.5	77	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Sept. 13	12 0	8243	+ 3.5	+ 9.5	---	185
		8242	+27.5	+10.5	15	---
		8239	+35.0	−19.0	15	---
		8249	+47.5	−26.5	---	108
			+52.0	−27.5	---	46
			+55.5	−26.5	154	---
17	11 57	8257	−83.5	+13.0	---	741
			−72.0	+13.5	---	586
		8260	−78.0	−18.0	216	---
		8256	−67.5	−12.5	123	---
			−59.5	−14.0	---	123
		8262	−57.0	+15.0	---	9
		8255	−38.0	−15.5	---	31
		8252	−29.0	−13.5	---	247
		8250	−12.0	+24.0	---	216
		8244	+36.0	+ 7.5	31	---
		8253	+43.0	+ 9.0	---	9
		8243	+60.0	+ 9.0	---	31
18	11 56	8257	−67.5	+13.0	340	---
			−57.5	+13.5	---	617
		8260	−66.0	−18.0	201	---
		8256	−52.5	−12.5	---	108
			−46.0	−13.5	---	93
		8262	−42.0	+15.0	---	31
		8259	−38.5	+11.5	---	15
		8252	−17.0	−13.5	---	123
		8254	− 2.0	+11.0	---	15
		8250	+ 0.5	+24.0	---	170
19	12 3	8263	−66.0	− 8.5	---	93
		8257	−53.5	+13.0	---	370
			−44.0	+13.5	---	556
			−52.0	+19.0	---	15
		8260	−51.5	−18.0	216	---
		8256	−35.5	−13.5	---	401
		8262	−30.5	+15.0	---	46
		8259	−17.5	+11.5	---	9
		8252	− 2.5	−12.5	---	123
		8250	+12.5	+24.0	---	154
20	12 1	8263	−52.0	− 8.5	---	278
			−39.5	+19.0	---	9
		8257	−39.5	+13.0	---	432
			−31.0	+14.0	---	679
		8260	−38.0	−18.0	170	---
		8256	−27.0	−13.0	---	139
			−18.0	−13.5	---	309
		8262	−17.5	+14.5	---	46
		8259	− 1.0	+11.0	---	31
		8252	+11.0	−13.0	---	46
		8264	+11.5	−19.5	---	15
		8250	+26.6	+24.0	---	123
		8261	+44.0	−23.0	---	46
22	12 1	8266	−66.5	− 8.0	31	---
		8263	−27.5	− 8.0	---	123
			−21.0	− 8.5	---	154
		8257	−13.5	+14.0	---	309
			− 3.5	+14.5	---	741
		8260	−12.0	−18.0	---	170
			+ 1.0	−29.0	---	9
		8256	+ 6.0	−12.5	---	556

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Sept. 22	12 1	8262	+10.0	+15.5	---	93
		8259	+27.5	+12.0	---	46
		8264	+35.0	−19.0	---	6
			+40.5	−20.0	---	9
		8250	+52.0	+24.0	---	154
		8261	+71.0	−22.5	---	62
26	11 53	8270	−60.5	−18.0	---	247
		8266	−21.0	−11.0	---	46
			−16.0	− 9.5	---	62
		8268	+13.5	+ 8.0	---	31
		8269	+19.5	−18.0	---	31
			+23.0	−18.0	---	62
		8263	+34.0	− 8.5	---	123
		8260	+40.5	−18.5	---	139
		8257	+40.0	+12.5	---	154
			+49.0	+13.5	---	617
		8256	+55.0	−13.0	---	123
			+67.0	−13.0	---	494
		8262	+64.5	+14.5	62	---
		8259	+79.5	+11.5	---	247
27	11 56	8270	−45.0	−18.0	154	---
		8266	− 8.0	−10.5	---	15
			− 2.0	− 9.5	31	---
		8268	+28.0	+ 8.0	---	62
		8269	+34.5	−18.0	---	77
		8263	+48.0	− 8.5	---	170
		8257	+53.0	+13.5	---	108
			+62.5	+15.0	617	---
			+63.0	+10.5	---	123
		8260	+53.5	−19.0	---	139
		8256	+68.5	−14.0	93	---
			+80.0	−14.5	617	---
29	11 50		−47.0	+18.0	---	15
		856j	−43.0	−12.0	6	---
		8271	−42.5	− 4.5	---	9
		8270	−19.0	−18.5	154	---
		8266	+23.0	− 9.5	9	---
		8268	+51.0	+10.0	---	46
			+57.0	+ 7.5	---	77
		8269	+65.0	−17.5	46	---
		8263	+78.0	− 9.5	---	46
		8260	+82.0	−18.5	154	---
Oct. 1	12 1	8275	−24.5	−18.0	---	62
			− 9.0	+12.5	31	---
		8272	− 7.0	−18.0	---	31
		8270	+ 3.0	−18.0	---	31
			+ 8.5	−19.0	247	---
		8268	+80.0	+ 7.5	46	---
2	11 53	8276	−62.0	−24.0	---	77
			− 1.0	+22.0	15	---
		8272	+ 3.0	−17.5	---	31
			+ 8.5	−18.5	15	---
		8270	+21.5	−19.0	247	---
			+79.0	+ 7.0	31	---
3	12 1	8276	−48.0	−24.0	---	93
		8272	+20.0	−18.0	---	15
		8270	+34.0	−18.5	262	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Oct. 4	11 56	8278	−39.0	+19.5	15	---
		8276	−35.5	−23.5	---	77
		8279	−17.0	−18.0	---	6
			+13.5	−20.5	9	---
		8272	+34.5	−19.5	31	---
		8270	+48.0	−18.5	---	247
8	12 1		−60.5	+10.5	---	31
		8280	−37.0	+ 2.0	15	---
			−34.0	− 9.5	---	31
			− 8.5	+ 5.0	6	---
		8278	+11.5	+19.0	---	108
			+15.0	+19.0	---	62
			+20.5	+19.0	108	---
		8279	+32.5	−21.5	---	31
			+37.5	−20.5	---	46
11	11 54	8285	−78.0	+14.0	31	---
		8284	−72.5	−19.0	108	---
		8283	−70.5	+11.0	---	154
		8286	+19.5	+ 9.5	---	12
			+27.5	+14.0	---	15
		8282	+33.0	−20.5	---	9
			+37.5	−19.5	---	15
			+38.0	−12.5	---	3
		8278	+49.5	+20.0	---	15
			+56.0	+19.0	---	46
			+62.0	+20.0	93	---
13	11 55	8290	−85.0	+12.0	309	---
		8289	−69.5	−13.0	370	---
			−69.5	−17.0	46	---
		8283	−43.5	+11.0	---	77
		8288	0.0	−10.0	---	15
		8287	+43.0	+ 4.5	---	31
		8286	+48.0	+ 9.5	---	62
		8282	+65.0	−19.5	15	---
15	11 55	8290	−59.5	+12.0	340	---
		8289	−47.5	−17.0	---	15
			−44.0	−13.0	293	---
		8283	−17.5	+11.5	25	---
		8288	+24.5	−10.0	---	6
			+28.0	−14.5	15	---
17	12 2	8292	−62.5	+ 8.5	---	46
			−57.5	+ 9.0	---	15
		8290	−32.5	+11.5	309	---
		8289	−20.0	−15.0	9	---
			−18.0	−13.0	278	---
		8283	+11.0	+11.5	6	---
		8293	+15.0	+17.0	---	15
		8288	+50.0	−10.5	---	62
			+53.5	− 9.0	---	77
20	11 56	8295	−35.0	+ 7.5	---	93
			−33.5	+ 5.0	---	77
		8292	−22.0	+ 8.0	---	62
			−17.5	+ 7.5	---	46
		8291	− 9.0	+18.5	---	108
			− 2.5	+17.5	31	---
		8290	+ 8.0	+11.0	293	---
		8289	+22.0	−14.0	278	---
			+40.5	−20.0	---	15

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Oct. 22	12 3	8299	−80.0	−22.0	---	463
		8297	−77.0	−17.5	247	---
		8296	−34.0	−22.0	---	108
			−29.5	−21.0	---	93
		8295	− 8.0	+ 7.5	---	139
		8292	+ 5.0	+ 8.0	---	123
			+11.0	+ 7.5	---	31
		8291	+18.0	+18.5	62	---
			+24.5	+17.5	---	31
		8290	+33.5	+13.0	---	108
			+34.0	+11.0	247	---
		8289	+49.0	−13.0	---	247
23	11 56	8299	−74.0	−21.0	---	93
			−66.0	−22.0	---	309
		8297	−62.5	−17.5	154	---
		8298	−43.0	+20.0	---	15
		8296	−18.0	−22.0	---	247
		8295	+ 5.0	+ 7.5	---	93
		8292	+17.0	+ 8.0	---	77
			+22.0	+ 7.5	---	62
			+26.0	+ 7.5	---	9
		8291	+31.0	+18.0	46	---
			+39.0	+18.0	28	---
		8290	+47.5	+12.0	---	340
		8289	+63.0	−13.5	---	185
27	11 55	8301	−78.0	−19.0	---	123
			−68.0	−19.0	62	---
		8300	−34.0	−18.0	---	31
		8299	−14.0	−21.0	---	185
		8297	−11.0	−17.5	---	93
			− 3.5	−11.0	6	---
		8298	+ 3.0	+22.0	---	15
			+10.0	+21.0	---	15
		8296	+30.5	−22.0	---	108
			+39.0	−21.0	---	93
		8292	+79.0	+ 5.0	---	77
Nov. 1	11 53	8309	−81.0	−13.5	---	309
		8306	−33.0	+24.0	---	93
			−26.5	+22.5	---	77
		8305	+37.5	−18.5	---	278
		8299	+51.0	−21.5	---	123
		8303	+53.0	+ 4.5	---	154
		8302	+66.0	−10.5	62	---
5	11 56	8309	−30.5	−17.5	---	62
			−27.5	−16.0	---	278
			−23.0	−14.0	---	46
			−19.0	−12.0	123	---
		8307	0.0	+ 8.0	---	185
6	11 58	8312	−85.0	+15.5	77	---
			−78.0	+13.0	77	---
		8309	−14.0	−15.0	---	340
			− 6.0	−12.0	123	---
		8307	+11.0	+ 8.0	---	123
			+16.0	+ 7.5	---	139
7	11 56	8312	−72.0	+15.5	---	77
			−65.5	+13.0	62	---
		8309	0.0	−16.0	---	216
			+ 7.0	−13.5	---	154

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Nov. 7	11 56	8313	+10.0	+ 9.5	31	---
			+14.5	+ 9.0	31	---
		8307	+23.0	+ 8.5	---	154
			+30.0	+ 7.5	---	154
8	12 2	8312	−58.0	+15.0	---	93
			−52.0	+13.0	---	62
		8309	+12.5	−15.5	---	216
			+19.5	−13.5	---	154
		8313	+22.0	+10.5	31	---
			+29.0	+ 9.5	46	---
		8307	+38.5	+ 8.5	---	154
			+45.5	+ 7.5	---	185
9	12 8	8316	−82.0	+12.0	247	---
		8315	−72.0	−10.5	139	---
		8312	−50.5	+12.0	---	15
			−43.5	+14.0	---	123
			−38.0	+13.0	---	46
		8309	+26.5	−17.0	---	231
			+34.5	−12.5	77	---
		8313	+37.0	+10.0	---	62
			+42.0	+ 8.0	---	62
		8307	+52.5	+ 7.0	---	108
			+59.5	+ 5.5	---	247
12	11 57	8316	−62.5	+13.0	---	3
			−48.0	+12.5	---	93
			−43.0	+12.0	139	---
		8315	−34.5	− 9.5	123	---
		8314	−28.0	−22.0	---	46
			−20.5	−19.0	31	---
		8312	− 3.5	+14.0	---	31
			+ 3.5	+14.5	3	---
		8309	+70.0	−17.5	15	---
			+75.0	−12.5	31	---
		8313	+86.0	+ 8.0	154	---
15	12 9	8320	−85.5	+ 7.5	154	---
			−75.0	+ 8.0	93	---
		8319	−35.5	+14.5	---	139
			−30.5	+11.5	---	62
		8316	− 6.0	+13.5	---	154
			− 2.5	+12.0	139	---
		8315	+ 6.0	− 9.0	123	---
			+13.5	−10.0	---	15
		8317	+17.5	+ 8.5	---	77
		8314	+21.0	−18.5	---	46
16	12 2	8320	−72.5	+ 7.0	---	185
			−67.0	+ 8.0	93	---
		8319	−22.5	+15.5	---	77
			−17.5	+12.0	---	46
		8316	+ 6.5	+13.5	---	46
			+10.0	+12.0	154	---
		8315	+19.0	− 9.5	108	---
		8317	+33.0	+ 8.5	---	154
		8314	+34.5	−18.5	46	---
17	11 58		−80.0	+ 7.0	31	---
		8323	−79.5	−10.5	46	---
		8320	−60.0	+ 7.5	---	77
			−53.5	+ 8.5	93	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Nov. 17	11 58	8319	− 9.0	+15.5	---	46
			− 1.0	+11.5	15	---
		8316	+22.5	+13.5	---	216
		8315	+32.0	− 9.0	108	---
		8317	+42.5	+ 9.0	---	62
			+49.5	+ 8.0	123	---
		8314	+48.0	−18.5	46	---
			−49.0	− 8.5	---	93
20	11 57	8323	−39.0	−11.0	---	93
		8320	−16.5	+ 8.5	---	77
		8325	− 4.0	−30.0	---	123
		8319	+31.0	+12.5	---	62
		8316	+61.5	+12.0	154	---
		8315	+70.5	−10.0	---	62
23	11 55	8328	−71.0	−15.0	31	---
		8327	−56.0	−12.0	---	154
		8323	− 9.5	− 8.0	---	31
			− 2.5	−14.0	---	31
			− 2.0	−18.0	31	---
		8326	− 1.5	+18.5	---	31
			+ 2.5	−10.0	31	---
		8324	+ 3.0	−17.0	---	46
		8320	+27.0	+ 8.5	31	---
		8325	+37.0	−30.0	31	---
26	11 55	8334	−73.5	+ 7.0	216	---
		8333	−45.0	−17.5	31	---
		8328	−32.0	−17.5	---	401
			−29.0	+18.5	---	46
		8327	−18.0	−12.5	---	154
		8330	+19.0	− 8.5	---	216
		8332	+43.5	+21.0	---	62
		8324	+47.0	−15.5	---	93
Dec. 1	11 54	8343	−46.0	+ 8.0	---	31
		8346	−37.5	− 7.5	---	15
		8340	−28.0	+ 7.5	---	216
		8345	−23.0	−19.5	---	31
			−17.0	−20.0	9	---
		8344	−22.5	− 5.5	---	31
		8335	−14.5	+22.0	---	123
			− 9.5	+20.5	---	31
		8334	− 5.5	+ 6.0	---	46
		8333	+17.5	−19.5	---	31
			+25.0	−19.5	77	---
		8328	+33.0	−17.5	---	370
			+41.0	−16.0	---	432
		8337	+48.0	− 9.5	---	278
			+53.5	− 7.5	278	---
		8327	+49.5	−13.0	---	62
		8341	+64.5	+23.0	---	62
			+69.0	+21.0	108	---
5	12 3	8348	−73.5	+ 7.5	278	---
		8346	+20.0	− 8.0	40	---
		8340	+22.0	+ 6.5	---	31
			+29.0	+ 6.0	102	---
		8345	+27.0	−21.0	---	15
			+33.5	−21.0	77	---
		858n	+33.0	−11.5	9	---
		8334	+48.0	+ 4.5	15	---
		8328	+83.0	−17.5	---	309

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Dec. 10	11 55	8352	−78.0	−12.0	---	309
		8349	−35.5	+9.0	---	185
		8348	−6.5	+7.5	231	---
		8350	−2.0	+13.5	---	77
			+2.0	+12.5	---	62
11	11 59	8352	−67.0	−12.0	---	432
		8353	−43.0	+5.5	---	46
		8349	−26.0	+8.5	---	31
			−20.0	+9.5	---	139
		8348	+4.0	+8.5	---	31
			+8.0	+8.0	216	---
		8350	+14.0	+13.0	---	108
15	12 4	8360	−67.0	+21.0	123	---
		8357	−52.0	−20.0	---	31
		8359	−42.5	+2.0	15	---
		8355	−37.5	+8.5	---	201
		8356	−22.5	−18.0	---	31
		8352	−12.5	−12.0	---	185
			−7.5	−13.5	170	---
		8353	+8.0	+7.0	---	123
			+18.0	+7.5	123	---
		8361	+12.0	+13.5	6	---
		8349	+35.0	+10.0	---	31
		8354	+43.0	+8.0	---	494
			+53.5	+7.5	---	586
		8348	+61.5	+8.0	247	---
		8358	+70.0	−15.0	31	---
20	12 2	8372	−80.0	−14.5	123	---
		8370	−67.0	−12.0	278	---
		8369	−52.5	+14.0	22	---
		8366	−51.0	−5.5	185	---
		8371	−48.0	−22.0	---	62
		8364	−25.5	−17.0	---	278
		8368	−21.5	+25.5	---	108
		8362	−19.5	−20.5	---	31
		8367	−7.5	+28.5	---	154
		8360	−5.0	+20.0	15	---
		8365	+6.5	−14.0	---	77
		8357	+17.5	−18.5	---	46
		8359	+22.0	+2.0	---	31
		8373	+26.0	+7.0	---	31
			+31.0	+4.5	---	15
		8355	+31.5	+9.0	---	170
		8356	+49.5	−16.0	---	31
		8352	+52.5	−12.5	---	31
			+60.0	−13.0	185	---
		8353	+85.0	+7.0	154	---
21	11 59	8374	−78.0	+4.5	432	---
		8375	−77.5	−9.5	---	93
		8372	−67.0	−14.5	123	---
		8370	−52.5	−12.0	278	---
		8369	−45.5	+19.0	---	62
			−39.5	+15.5	---	62
		8366	−38.0	−5.5	154	---
		8371	−35.0	−22.0	---	62
		8364	−12.0	−17.0	---	247
		8368	−9.5	+25.5	---	278
		8367	+2.5	+29.0	---	62
		8360	+9.0	+20.5	22	---
			+9.5	+28.5	37	---
		8365	+15.0	−13.0	---	46
			+20.5	−14.5	---	62

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1917	h m		°	°		
Dec. 21	11 59	8357	+32.0	−18.0	---	62
		8373	+44.0	+4.5	---	77
		8355	+45.5	+9.0	---	154
		8352	+72.0	−13.5	216	---
22	11 59	8374	−67.5	+0.5	---	46
			−63.0	+3.5	556	---
		8375	−62.0	−9 0	---	93
		8372	−54.0	−14.5	108	---
		8376	−42.5	−17.0	---	31
		8370	−39.0	−12.0	247	---
		8369	−29.0	+17.5	---	93
		8366	−25.0	−5.0	139	---
		8371	−19.5	−21.0	---	31
		8364	−3.5	−17.5	---	15
			+3.5	−16.0	---	154
		8368	+4.0	+25.0	---	247
		8367	+19.0	+28.5	---	46
		8365	+35.0	−14.5	---	15
		8357	+45.0	−18.0	---	9
			+56.5	+14.0	---	9
		8373	+57.0	+4.0	---	93
		8355	+59.5	+9.5	---	93
		8352	+85.0	−14.0	154	---
28	11 52	8383	−62.5	+10.0	---	139
		8384	−53.5	−11.5	---	31
			−31.0	−9.0	---	123
		8378	−24.0	+8.0	154	---
		8377	−18.5	−8.0	---	370
		8374	+18.0	+2.5	---	401
		8375	+18.5	−9.5	77	---
		8382	+22.5	+11.5	---	93
		8372	+25.0	−16.5	46	---
		8370	+41.5	−12.0	---	216
		8369	+47.0	+18.0	---	370
			+56.0	+17.0	278	---
		8379	+53.0	−24.0	---	31
			+53.5	−18.0	---	62
		8366	+57.0	−7.0	123	---
		8371	+60.0	−17.5	31	---
			+63.0	−23.0	62	---
1918 Jan. 4	12 8	8389	−77.0	+7.5	93	---
		8387	−38.0	+8.0	278	---
			−32.5	+7.5	154	---
		8386	+7.5	−19.0	---	62
		8388	+16.0	−9.0	---	62
		8383	+33.0	+11.5	185	---
		8378	+70.0	+9.0	123	---
		8377	+74.0	−7.5	247	---
8	11 58	8392	−64.0	−17.5	---	216
		8390	−45.0	+17.0	31	---
			−38.0	+15.0	---	154
			−30.0	+13.5	154	---
		8389	−22.5	+7.0	46	---
		8387	+18.5	+7.5	---	432
10	12 9	8393	−64.0	−26.0	15	---
		8392	−40.0	−19.0	---	185
			−34.0	−17.5	---	278
		8390	−17.5	+17.5	---	31
			−9.5	+15.0	---	154
			−3.5	+13.5	139	---
		8389	+4.0	+7.0	62	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1918	h m		°	°		
Jan. 10	12 9	8387	+43.0	+ 7.5	278	---
			+47.5	+ 6.5	108	---
12	11 52	8397	−27.0	+ 4.5	---	15
		8392	−15.0	−18.5	154	---
			− 8.0	−15.5	---	278
		8390	+12.0	+17.5	---	77
			+17.5	+15.5	---	154
			+22.5	+14.0	108	---
			+23.0	+17.5	22	---
		8389	+30.5	+ 7.0	31	---
		8387	+70.0	+ 8.0	309	---
			+73.5	+ 7.0	62	---
16	11 59	8402	−68.0	+20.0	62	---
			−57.0	+18.0	123	---
		8401	−59.5	−10.0	---	77
			−51.0	− 6.5	123	---
		8400	−53.5	−15.5	---	1080
		8399	+ 2.0	+22.0	---	278
		8397	+27.5	+ 3.5	---	62
		8392	+47.5	−16.0	62	---
		8390	+62.0	+17.0	216	---
			+69.5	+14.5	309	---
			+75.0	+13.0	108	---
17	12 6	8406	−75.5	+ 2.5	154	---
		8402	−55.0	+20.0	31	---
			−44.0	+18.0	123	---
		8401	−47.0	−11.0	---	62
			−38.5	− 6.5	77	---
		8400	−40.5	−15.0	---	926
		8399	+11.0	+23.0	---	108
			+18.0	+21.0	---	154
		8397	+43.0	+ 2.5	15	---
		8392	+60.0	−15.5	62	---
		8390	+76.0	+17.5	154	---
			+86.0	+15.0	309	---
18	12 0	8406	−62.0	+ 2.5	93	---
		8402	−41.5	+19.5	22	---
			−30.5	+18.0	123	---
		8401	−32.5	−11.5	---	46
			−25.0	− 6.5	77	---
		8400	−27.0	−15.0	---	926
		8407	−16.5	+18.5	---	37
		8399	+23.5	+23.0	---	123
			+30.5	+21.0	---	154
		8392	+73.0	−15.5	46	---
19	12 0	8409	−87.0	− 8.0	154	---
		8406	−48.0	+ 2.5	93	---
		8402	−28.0	+19.5	31	---
			−17.5	+18.0	93	---
		8401	−19.5	−11.0	---	46
			−11.5	− 6.5	77	---
		8400	−13.5	−14.5	---	772
		8407	− 5.5	+19.0	31	---
			− 0.5	+18.0	---	31
		8399	+37.5	+23.0	---	93
			+46.5	+21.5	170	---
21	12 2	8409	−59.5	− 8.0	170	---
		8410	−29.5	+ 9.0	---	62
		8406	−21.5	+ 3.0	---	31
		8412	−14.5	−15.5	---	15
1918	h m		°	°		
Jan. 21	12 2		−12.0	+ 2.5	---	31
		8402	+ 9.0	+18.0	108	---
		8400	+ 9.5	−10.0	15	---
			+13.5	−14.5	---	648
		8401	+15.0	− 6.0	62	---
		8407	+20.5	+19.5	15	---
		8399	+72.0	+22.0	123	---
24	11 59	8413	−60.5	+11.0	123	---
		8415	−52.0	−20.0	---	37
		8409	−19.5	− 8.0	93	---
		8410	+11.5	+10.0	---	93
		8412	+21.0	−16.0	---	154
			+25.0	−15.0	123	---
		8402	+48.0	+17.5	77	---
		8400	+48.5	−14.5	---	77
			+54.5	−14.5	---	340
		8401	+55.0	− 6.0	77	---
		8407	+66.0	+17.5	15	---
29	12 15	8422	−76.0	−29.5	---	216
		8419	−66.5	+ 9.0	154	---
		8417	− 7.5	−10.5	---	77
		8413	+ 7.0	+10.5	31	---
		8415	+10.5	−21.5	---	46
			+13.5	−19.5	---	15
			+19.0	−19.0	93	---
		8421	+38.5	−18.5	---	62
		8409	+47.5	− 9.0	---	15
		8420	+48.0	+13.5	---	62
		8410	+72.5	+ 8.0	31	---
		8412	+83.0	−19.0	---	154
Feb. 4	12 2	8423	−37.5	+13.0	108	---
		8426	−30.5	+17.5	---	31
		8422	− 6.0	−31.5	15	---
			+ 3.0	−30.0	22	---
		8419	+12.5	+ 9.0	139	---
		8425	+34.0	−13.5	15	---
		8417	+79.0	−10.0	31	---
5	11 59	8423	−23.5	+13.0	93	---
		8426	−16.0	+16.0	---	31
		8422	+16.0	−30.5	---	46
		8419	+27.0	+ 9.0	154	---
6	11 56	8427	−75.0	+13.5	31	---
		8423	−10.5	+13.5	---	77
			+10.0	+12.0	---	6
		8419	+39.5	+ 8.5	123	---
			+40.0	+11.0	15	---
7	11 59	8428	−67.5	− 9.0	---	15
		8427	−61.0	+13.5	---	15
		8423	+ 2.5	+13.0	---	46
		8419	+52.0	+ 8.5	139	---
8	11 58	8428	−53.5	− 9.0	---	31
		8423	+16.0	+12.5	---	31
		8419	+67.5	+ 9.0	185	---
11	12 0	8433	−77.0	+ 3.5	---	741
		8430	−69.0	−12.5	31	---
		8431	−33.0	+18.5	---	31
		8428	−17.5	− 7.0	31	---
			−13.5	− 9.0	---	185
		8427	− 4.5	+14.0	---	31

1757—29——30

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1918	h m		°	°		
Feb. 12	11 55	8434	−82. 5	−17. 0	---	154
		8433	{−69. 0	+ 1. 0	62	---
			−68. 0	+ 4. 0	---	370
			−62. 0	+ 3. 5	---	309
		8430	−57. 0	−12. 0	---	62
		8431	−20. 5	+18. 5	---	93
		8428	− 1. 0	− 8. 5	---	216
		8427	{+ 4. 5	+13. 5	---	31
			+10. 0	+14. 0	77	---
13	11 54	8434	−69. 0	−17. 0	---	154
		8433	{−57. 5	+ 1. 0	---	62
			−57. 0	+ 4. 0	---	324
			−48. 5	+ 3. 5	---	247
		8430	−43. 5	−11. 5	---	77
		8431	− 8. 0	+18. 0	---	62
		8428	{+11. 5	− 8. 0	---	93
			+17. 0	− 9. 0	---	108
		8427	+22. 0	+14. 5	---	93
15	11 59	8434	−42. 5	−17. 5	---	139
		8433	−26. 0	+ 4. 0	---	556
		8430	−17. 5	−11. 0	---	15
		8428	+41. 0	− 9. 5	---	93
		8427	+49. 0	+13. 5	---	46
			+70. 0	−24. 5	15	---
18	12 1	8439	−68. 0	−19. 5	123	---
		8434	− 4. 0	−17. 0	---	31
		8433	{+ 9. 5	− 0. 5	---	31
			+12. 0	+ 3. 5	---	247
			+17. 5	+ 4. 0	---	216
			+22. 0	+ 3. 5	123	---
		8430	{+22. 0	−10. 0	---	31
			+27. 5	− 9. 5	---	123
20	11 57	8439	−42. 0	−20. 0	---	185
		8434	+23. 5	−17. 0	22	---
		8433	{+37. 5	+ 4. 5	---	216
			+45. 0	+ 7. 0	---	139
			+48. 0	+ 4. 0	123	---
		8430	+52. 5	− 9. 5	---	123
21	11 57	8440	{−82. 0	+10. 5	154	---
			−73. 0	+ 8. 0	139	---
		8439	{−39. 0	−22. 0	---	46
			−39. 0	−19. 5	139	---
		8434	+37. 5	−17. 5	---	31
		8433	{+53. 0	+ 4. 5	---	216
			+59. 0	+ 6. 0	---	123
			+62. 0	+ 4. 0	154	---
		8430	+67. 0	− 9. 5	---	62
23	11 55	8440	{−58. 0	+10. 5	154	---
			−48. 0	+ 7. 5	123	---
		8439	− 2. 0	−19. 5	108	---
		8438	+29. 0	−20. 0	---	15
		8433	+77. 0	+ 4. 5	---	123
27	11 57	8446	−61. 5	−12. 0	---	139
		8444	−45. 0	+ 8. 0	108	---
		8440	{− 3. 0	+10. 5	123	---
			+ 7. 0	+ 7. 5	108	---
		8439	+50. 0	−20. 0	77	---
1918 Feb. 28	11 59	8446	−47. 5	−12. 0	---	123
		8444	−31. 0	+ 8. 0	108	---
		8440	{+10. 0	+10. 5	108	---
			+19. 5	+ 7. 5	123	---
		8439	+62. 5	−20. 0	77	---
		8445	+62. 5	+14. 5	15	---
Mar. 2	11 56	8446	−19. 5	−12. 0	62	---
		8444	− 5. 5	+ 7. 5	123	---
		8440	{+37. 5	+10. 5	---	31
			+47. 0	+ 7. 0	93	---
5	12 4	8449	+ 9. 0	− 5. 5	---	15
		8446	+20. 5	−11. 5	---	62
		8444	+35. 0	+ 7. 5	77	---
			−38. 5	−18. 0	3	---
7	12 0	8450	−47. 0	− 8. 5	31	---
		8446	+48. 0	−11. 0	37	---
		8444	+61. 0	+ 7. 5	123	---
		8451	+67. 0	− 7. 5	---	93
8	11 55	8453	{−78. 0	+18. 0	247	---
			−72. 5	+20. 0	---	278
		8452	−51. 5	−16. 0	15	---
		8450	−32. 0	− 8. 5	25	---
		8446	+60. 0	−11. 0	15	---
		8444	+74. 0	+ 7. 5	123	---
		8451	+82. 0	− 8. 0	---	370
11	12 1		−50. 5	− 9. 0	---	62
		8455	{−48. 0	−18. 5	---	62
			−42. 0	−17. 5	31	---
		8453	{−38. 0	+18. 5	---	247
			−29. 0	+19. 0	93	---
		8454	− 9. 5	−20. 0	---	31
		8459	− 5. 0	−25. 5	22	---
		8450	+10. 0	− 8. 5	15	---
19	11 52	8468	−77. 0	−18. 0	---	185
		8467	−72. 0	+15. 5	---	123
		862k	−69. 0	−24. 5	15	---
		8466	{+ 3. 5	+ 3. 0	---	15
			+ 8. 0	+ 8. 0	---	31
		8464	+11. 0	+ 3. 0	---	62
		8460	{+56. 0	+10. 0	---	62
			+63. 0	+ 9. 0	---	77
		8465	+64. 0	−11. 5	---	93
		8453	{+66. 0	+19. 5	340	---
			+72. 5	+21. 0	---	340
			+77. 0	+18. 0	---	123
25	11 58	8475	−63. 0	+ 8. 0	---	31
		8473	−48. 5	− 3. 5	170	---
		8472	−29. 5	−14. 5	---	247
		8474	−26. 0	−22. 0	31	---
		8470	{− 8. 0	−19. 0	77	---
			− 2. 5	−17. 5	---	31
		8468	{+ 0. 5	−19. 0	62	---
			+ 3. 0	−21. 0	25	---
			+ 4. 5	−16. 0	---	93
			+ 9. 0	− 9. 5	9	---
Apr. 16	11 55	8497	{− 6. 0	−10. 0	9	---
			− 1. 5	− 9. 5	22	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1918	h m		°	°		
Apr. 16	11 55	8492	+23.0	+ 3.5	---	46
		8493	+24.0	−14.5	15	---
		8490	+42.0	+11.0	---	108
		8489	+42.0	− 0.5	108	---
17	11 42	8497	+10.0	− 9.5	---	15
		8493	+29.5	−15.0	---	31
		8492	+36.5	+ 3.5	---	93
		8490	+56.5	+11.0	---	46
		8489	+57.0	− 0.5	62	---
22	11 55	8501	{−71.0	−21.0	93	---
			−67.0	−22.5	---	62
		8500	−34.5	− 5.0	93	---
		8499	{+21.0	−11.5	---	62
			+26.0	− 9.5	---	77
		8498	{+42.0	−21.0	---	31
			+50.0	−20.5	15	---
23	11 52	8502	−72.5	− 8.5	309	---
		8501	{−58.0	−21.0	93	---
			−52.5	−22.0	---	15
		8500	−20.5	− 5.0	77	---
		8499	{+35.0	−11.0	---	37
			+40.5	− 9.5	108	---
		8498	+63.5	−21.0	46	---
24	12 2	8502	−60.0	− 8.5	247	---
		8501	−42.5	−23.5	---	185
		8500	− 8.0	− 5.0	77	---
		8499	+52.5	− 9.0	108	---
May 6	11 47	8520	−72.0	−17.0	15	---
		8519	−60.5	+ 0.5	---	62
		8516	{−50.0	+19.0	123	---
			−47.0	+19.5	---	62
			−40.5	+19.5	22	---
			−36.0	+18.0	309	---
		8515	−22.5	+14.5	185	---
		8512	− 4.5	−21.0	---	62
		8514	{− 4.0	+22.0	6	---
			+ 2.0	+19.0	---	31
		8508	{+52.0	+13.0	---	31
			+56.0	+17.5	---	62
		8513	+76.5	+13.5	123	---
8	11 56	8523	{−57.5	+ 9.0	---	31
			−53.0	+ 7.0	---	46
		8520	{−50.5	−17.5	37	---
			−42.0	−17.0	---	15
		8519	−31.5	+ 0.5	46	---
			−31.5	−22.0	6	---
		8516	{−23.5	+19.5	31	---
			−17.0	+20.0	---	62
			− 8.5	+18.5	278	---
		8515	+ 2.5	+16.0	154	---
		8512	+23.0	−20.5	31	---
		8514	+30.5	+19.0	9	---
9	11 47		−57.0	+14.0	15	---
		8523	{−44.0	+ 9.0	---	31
			−38.5	+ 7.0	---	31
		8520	{−37.5	−17.5	---	9
			−29.5	−17.0	9	---
		8519	−19.0	0.0	---	37
1918	h m		°	°		
May 9	11 47	8516	{−11.0	+19.5	---	15
			− 2.0	+19.0	---	77
			+ 3.5	+18.5	278	---
		8515	+16.0	+16.0	---	185
		8512	+36.0	−20.5	31	---
11	12 3	8528	−82.0	−22.0	---	154
		864g	−10.0	+12.0	6	---
		8520	− 7.0	−17.5	---	93
		8519	+10.0	− 0.5	15	---
		8516	{+21.5	+20.0	31	---
			+31.0	+18.0	278	---
			+32.5	− 8.0	---	31
		8515	+43.5	+15.0	---	62
13	12 5		−69.0	+10.5	15	---
		8528	−53.0	−22.0	---	154
		8527	{−18.0	− 6.5	---	31
			−11.0	− 5.0	---	15
		8520	{+19.0	−18.0	---	31
			+23.5	−17.5	---	15
		8519	+37.5	− 0.5	6	---
		8516	+57.5	+17.5	185	---
15	11 45	8530	−67.0	+ 6.0	31	---
		8529	−64.0	+11.0	---	31
		8528	{−29.5	−22.0	---	31
			−22.5	−21.5	---	62
		8527	+13.0	− 5.5	---	62
			+40.0	+ 6.0	9	
		8520	+44.5	−17.5	15	---
		8516	+85.0	+17.5	309	---
17	11 44	8530	−38.5	+ 6.5	15	---
		8529	−36.5	+12.0	---	46
		8528	{− 1.0	−21.0	---	46
			+ 4.5	−20.5	62	---
18	12 2	8530	−25.0	+ 6.5	---	46
		8529	−22.0	+12.0	---	123
		8528	+18.5	−20.5	62	---
20	12 6	8532	−73.5	− 9.0	139	---
		8529	+ 4.0	+11.0	---	62
		8528	{+44.5	−21.0	37	---
			+51.0	−19.5	15	---
21	12 2	8532	−60.5	− 9.0	139	---
		8529	+18.0	+11.0	---	62
		8528	+57.5	−21.0	25	---
23	12 9	8533	{−41.5	−12.0	---	15
			−40.5	−18.0	---	15
			−36.0	−12.5	25	---
		8532	−34.0	− 9.0	108	---
		8529	+44.0	+11.0	---	15
		8534	+58.0	−16.0	15	---
25	12 2		−44.5	+13.5	---	31
		8540	−28.0	+11.5	12	---
		8533	−11.0	−12.0	---	77
		8532	− 8.0	− 9.0	123	---
27	12 10		−46.0	+ 2.5	---	31
		8533	+16.0	−12.0	---	309
		8532	+19.0	− 8.5	108	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1918	h m		°	°		
May 28	12 9	8547	−85.0	+15.0	123	---
		8541	−31.5	+2.5	---	31
		8533	+29.5	−12.0	---	556
		8532	+31.5	−8.5	93	---
29	12 4	8547	−72.0	+15.0	---	62
		8546	−62.5	+21.5	---	31
		8545	−41.0	−19.0	---	46
		8541	−18.0	+2.5	---	31
			+8.0	+4.5	---	15
		8533	+42.5	−12.0	---	525
		8532	+45.0	−8.5	77	---
June 4	12 2	8559	−43.0	+10.5	---	31
			−20.5	+19.0	25	---
		8555	−19.5	+9.5	9	---
		8554	−15.5	−10.0	---	62
		8549	−14.0	+17.0	170	---
			−13.5	+20.5	31	---
		8552	−8.0	+2.5	---	31
		8553	−8.0	−8.0	---	93
			−12.0	−7.5	---	31
		8558	−7.5	+13.5	---	93
		8547	+10.0	+18.0	---	15
		8551	+11.5	−6.0	---	15
		8548	+13.5	−27.0	---	62
		8545	+40.0	−20.5	---	123
5	12 0		−49.0	+11.0	15	---
		8561	−48.5	−15.5	---	31
		8555	−5.5	+9.5	15	---
		8554	−2.0	−10.0	---	31
		8549	−1.5	+17.0	185	---
		8553	+3.5	−8.0	---	154
		8558	+7.5	+12.5	---	139
		8552	+7.5	+2.0	---	31
		8551	+25.0	−6.0	---	15
		8545	+52.0	−21.0	---	77
8	12 14	8562	−33.0	+15.0	---	46
			+6.0	+12.0	---	46
		8549	+38.0	+17.0	170	---
			+42.0	+16.5	6	---
		8553–54	+46.0	−8.0	---	31
		8558	+47.5	+12.5	139	---
		8552	+50.0	+2.0	---	46
10	12 5		−9.5	−10.5	---	6
		8562	−2.5	+15.0	---	123
		8549	+65.0	+17.5	108	---
		8558	+73.5	+12.5	123	---
11	12 15	8562	+12.0	+13.5	---	77
		8549	+68.0	+16.5	154	---
12	12 7		−66.0	−10.0	15	---
		8562	+21.0	+15.5	---	6
			+26.5	+13.0	---	15
13	12 13	8563	−72.5	+19.0	46	---
		8562	+35.0	+15.0	---	15
15	11 34	8563	−45.5	+18.5	31	---
1918	h m		°	°		
June 17	11 59	8565	−51.0	−12.0	---	9
			−49.5	−9.5	---	9
		8563	−19.5	+19.0	9	---
19	12 9	8568	−63.5	−5.0	---	31
		8565	−26.5	−12.5	---	46
		8567	−8.0	+2.0	---	15
		8566	+22.5	−11.0	---	6
20	12 13	8568	−51.5	−7.0	---	77
		8565	−14.0	−12.5	---	108
		8569	+7.5	−13.5	---	46
		8566	+38.0	−11.0	---	15
July 11	12 8	8595	−80.0	+3.5	31	---
		8594	−71.0	+1.0	31	---
		8592	−47.0	−11.0	37	---
		8593	−11.0	−19.5	---	62
		8591	+2.0	−13.0	---	62
			+6.5	−11.5	---	93
		8586	+31.0	+15.0	46	---
		8585	+34.5	−16.0	123	---
		8589	+53.0	−18.5	---	123
		8582	+56.0	+10.0	---	31
			+64.0	+10.5	170	---
		8588	+80.0	+3.5	---	154
12	12 12		−71.0	−14.0	15	---
		8595	−66.5	+3.5	6	---
		8594	−58.0	+1.0	9	---
		8592	−32.5	−11.0	25	---
		8591	+14.5	−14.0	---	46
			+20.0	−12.0	---	62
		8586	+45.5	+15.5	---	46
		8585	+48.0	−16.0	154	---
		8589	+67.5	−18.5	---	93
		8582	+77.5	+11.0	154	---
15	12 1	8599	−72.0	+7.5	309	---
		8595	−30.5	+3.5	31	---
		8594	−22.5	+2.0	---	46
		8592	+8.0	−11.0	15	---
		8597	+24.0	−10.0	---	185
		8593	+44.5	−18.5	---	154
		8591	+63.5	−12.0	46	---
18	12 7	8601	−57.0	−12.5	---	185
		8600	−39.0	+5.5	---	46
		8599	−32.0	+8.0	340	---
		8597	+60.0	−11.5	185	---
			+67.0	−10.0	---	309
22	12 10	8606	−68.0	−17.0	123	---
		8607	−55.5	−25.0	31	---
		8603	−16.0	+15.5	---	154
		8601	−5.0	−14.5	---	216
		8599	+21.0	+8.0	324	---
			+22.5	−15.0	9	---
		8605	+21.5	+17.5	---	46
			+27.5	+13.5	---	46
		8604	+28.0	−14.0	15	---
23	12 0	8606	−64.0	−17.5	15	---
			−53.5	−18.0	108	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1918	h m		°	°		
July 23	12 0	8607	−40.5	−27.0	---	22
			−39.0	−12.0	---	15
		8603	−2.5	+15.0	---	216
		8601	+9.0	−14.0	---	247
		8599	+34.0	+8.0	309	---
		8605	{+35.5	+18.0	---	46
			{+41.0	+13.5	---	77
24	12 11	8610	−82.0	+8.0	62	---
		8609	−48.0	+5.0	---	31
		8606	−44.0	−17.5	---	108
		8607	−27.5	−27.0	---	31
		8608	−11.5	+13.5	---	15
		8603	+10.5	+14.0	---	309
		8601	{+19.0	−19.0	22	---
			{+21.0	−14.0	---	185
		8599	+47.5	+8.0	231	---
		8605	{+48.0	+18.5	---	15
			{+52.5	+13.5	---	31
25	12 4	8610	−68.0	+7.5	15	---
		8609	−33.5	+4.5	---	62
		8606	−29.0	−18.0	---	93
		8607	−14.0	−27.0	---	46
		8603	+24.5	+14.0	---	432
		8601	{+31.0	−13.5	---	62
			{+31.0	−18.5	---	46
			{+37.5	−14.5	---	154
		8599	{+61.0	+8.0	247	---
			{+61.0	+10.5	31	---
		8605	+67.5	+11.5	---	46
Aug. 1	12 30	8619	−72.0	−20.0	247	---
		8615	−17.5	+10.0	77	---
		8613	+8.0	+4.5	---	309
		8612	+26.0	+17.0	---	278
		8616	+67.0	−22.0	---	62
12	12 8	8635	−77.5	−14.5	123	---
		8631	{−58.0	+8.5	216	---
			{−50.5	+10.0	---	185
		8628	−32.5	+18.5	9	---
		8626	−22.5	+17.5	108	---
		8630	−8.0	−11.5	---	62
		8621	+56.0	−22.0	---	31
		8619	{+65.0	−20.0	93	---
			{+71.0	−21.0	185	---
13	12 3	8635	−62.0	−14.5	93	---
		8631	{−46.0	+8.5	201	---
			{−40.0	+10.0	---	123
			{−35.0	+10.5	---	154
		8626	−10.5	+15.5	93	---
		8630	{+1.5	−12.5	---	31
			{+8.0	−11.5	---	31
		8636	+50.5	−20.0	---	62
		8619	+85.0	−19.5	123	---
14	12 6	8640	−64.0	+13.5	---	123
			−60.0	−9.0	---	15
		8639	−55.0	−14.0	---	46
		8635	−49.0	−14.5	93	---
		8631	{−32.0	+8.5	216	---
			{−28.0	+10.0	---	93
			{−20.5	+10.0	---	201
1918	h m		°	°		
Aug. 14	12 6	8628	−4.5	+18.5	---	15
		8626	+2.0	+15.5	---	46
		8630	{+14.0	−13.0	---	15
			{+21.0	−11.5	---	31
			+57.0	−10.5	15	---
15	12 4	8640	−51.0	+13.0	---	123
		8635	−38.0	−15.5	---	185
		8631	{−16.5	+9.0	---	401
			{−8.0	+9.5	---	216
		8628	+8.0	+17.5	---	9
		8626	+15.0	+15.5	---	15
		8630	+36.0	−12.5	---	62
19	12 8	8648	−80.0	+8.0	77	---
		8646	−67.0	−19.0	-	123
		8643	−54.0	−18.5	---	401
			−51.5	+2.5	15	---
		8640	+1.0	+15.0	---	15
		8639	+9.5	−15.5	---	31
		8635	+17.0	−15.0	---	139
		8644	+25.5	+11.5	---	15
		8631	{+33.0	+10.0	---	77
			{+35.0	+8.0	154	---
			{+47.0	+8.5	---	370
		8641	{+42.0	+22.0	15	---
			{+47.5	+21.0	---	46
20	11 57	8652	−85.0	+7.5	---	617
		8651	−78.0	+17.0	---	309
		8648	−67.0	+7.5	31	---
		8646	−53.5	−19.5	---	93
		8643	{−42.0	−18.0	62	---
			{−38.5	−19.5	---	247
		8649	+23.0	+10.0	---	62
		8635	+29.5	−15.0	---	93
		8644	+41.5	+11.0	---	62
		8631	{+48.5	+10.0	---	216
			{+60.5	+8.5	---	401
		8641	+61.0	+20.5	62	---
22	11 59	8652	−57.0	+7.0	---	309
		8653	−53.0	−12.5	---	46
		8651	−52.5	+16.5	---	432
		8643	{−17.0	−18.0	46	---
			{−12.5	−20.0	---	231
		8647	+16.5	−9.5	---	77
		8635	+57.0	−15.0	---	123
		8644	+65.0	+11.0	185	---
		8631	{+70.0	+10.5	62	---
			{+75.0	+8.5	154	---
26	11 40		−70.0	−24.5	15	---
			−63.5	−22.5	46	---
		8657	−47.0	+10.0	15	---
		8658	−16.0	+4.5	---	31
		8652	−3.5	+5.0	---	185
		8651	−2.0	+16.0	---	432
		8654	{+5.0	0.0	---	31
			{+8.0	0.0	---	46
			+14.5	+7.5	9	---
		8643	+40.0	−20.0	---	278
		8647	+74.0	−9.5	62	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1918	h m		°	°		
Aug. 29	11 57	8660	−68. 0	−21. 0	62	---
			−68. 0	+ 2. 0	---	31
		8659	−59. 5	+20. 5	---	46
		8657	− 7. 5	+10. 0	9	---
		8651	+38. 0	+17. 0	---	432
		8652	{+37. 5	+ 2. 0	46	---
			{+39. 0	+ 5. 0	62	---
		8643	+82. 0	−19. 0	---	247
Sept. 3	12 15	8665	−52. 0	−22. 0	62	---
		8663	{+ 7. 5	−11. 0	---	31
			{+10. 5	−10. 5	---	46
			+40. 0	−14. 5	31	---
4	12 9	8665	−39. 0	−22. 0	31	---
		8663	+24. 0	−11. 0	---	15
9	11 54	8672	−48. 0	+12. 5	---	31
		8670	−47. 0	+ 7. 5	15	---
		8669	{−44. 0	+10. 0	---	15
			{−37. 0	+10. 5	46	---
		8668	−19. 0	+13. 0	---	31
		8674	{− 8. 0	−28. 0	31	---
			{− 3. 0	−28. 5	---	31
		8665	+27. 0	−22. 5	9	---
		8671	+69. 0	+23. 5	---	46
10	12 2	8676	−55. 5	−12. 5	---	62
		8675	−46. 0	−12. 0	15	---
		8672	{−38. 5	+11. 0	---	31
			{−33. 5	+12. 0	---	46
		8670	−32. 5	+ 7. 5	15	---
		8669	{−31. 0	+11. 5	---	77
			{−23. 0	+10. 5	37	---
		8668	− 7. 0	+12. 5	---	31
		8674	{+ 5. 5	−28. 5	62	---
			{+11. 0	−29. 0	46	---
		8665	+39. 5	−23. 0	15	---
13	11 56	8676	−14. 5	−12. 5	---	216
		8670	{+ 7. 0	+ 7. 5	15	---
			{+10. 0	+11. 0	---	46
		8669	+15. 5	+10. 5	22	---
		8674	+43. 0	−28. 0	62	---
		8677	+47. 0	−17. 5	---	154
19	11 53	8682	−63. 5	− 8. 5	93	---
		8681	−50. 5	− 9. 0	---	123
		8680	−47. 0	+15. 5	139	---
		8679	−27. 5	+18. 0	---	46
		8676	{+61. 0	−19. 0	---	216
			{+67. 5	−12. 5	---	340
21	11 59	8682	−35. 5	− 9. 0	62	---
		8683	{−33. 0	+ 8. 0	---	93
			{−27. 5	+ 8. 0	154	---
		8681	−24. 0	− 9. 0	---	93
		8680	−18. 0	+15. 5	---	185
		8679	+ 1. 5	+18. 5	6	---
23	12 1	8684	−56. 5	− 9. 0	19	---
		8682	{−13. 0	− 8. 0	---	31
			{− 9. 0	− 9. 0	62	---
		8683	{− 7. 5	+ 8. 0	---	123
			{− 1. 5	+ 7. 5	---	46
			{+ 1. 5	+ 8. 5	247	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1918	h m		°	°		
Sept. 23	12 1	8681	+ 2. 5	− 9. 0	---	93
		8680	+ 8. 0	+15. 5	---	185
		869n	+69. 5	+13. 5	31	---
24	12 2	8684	−43. 0	− 9. 0	15	---
		8685	− 8. 0	−11. 0	---	31
		8682	{− 0. 5	− 8. 0	---	62
			{+ 4. 5	− 8. 5	46	---
		8683	{+ 7. 5	+ 8. 0	---	62
			{+15. 5	+ 8. 0	185	---
		8681	+17. 0	− 9. 0	---	77
		8680	+20. 0	+15. 0	108	---
			+26. 0	−14. 0	6	---
25	11 59	8684	−29. 5	− 9. 0	15	---
		8685	+ 6. 0	−11. 0	---	46
		8682	{+13. 5	− 8. 0	---	15
			{+18. 0	− 9. 0	46	---
		8683	{+20. 0	+ 8. 5	---	15
			{+28. 0	+ 8. 0	185	---
		8681	+30. 5	− 9. 5	---	31
		8680	{+32. 5	+14. 5	123	---
			{+37. 0	+13. 5	---	31
27	11 52	8690	{−76. 0	+12. 0	---	123
			{−69. 0	+ 7. 5	---	93
		8687	−32. 0	−13. 0	---	185
		8688	−15. 5	−19. 5	---	31
			−13. 5	−32. 0	6	---
		8686	+ 7. 5	+ 5. 5	---	62
		869t	+22. 5	+22. 0	---	15
			+31. 0	+11. 0	---	46
		8682	+42. 0	− 8. 5	---	77
		8683	{+49. 0	+ 8. 0	---	77
			{+53. 5	+ 7. 5	216	---
		8680	{+59. 0	+14. 5	93	---
			{+67. 0	+14. 0	31	---
30	11 58	8692	−36. 5	+17. 0	---	77
		8690	{−34. 5	+11. 0	22	---
			{−30. 5	+ 8. 0	15	---
		8687	{+ 3. 5	−14. 5	---	62
			{+ 5. 5	−12. 0	---	247
			{+ 9. 0	−11. 0	---	62
			{+11. 5	− 9. 0	---	231
		8688	+27. 0	−19. 5	---	15
		8686	{+44. 0	+ 7. 0	---	31
			{+51. 5	+ 3. 5	---	31
		8691	{+68. 0	+11. 5	---	185
			{+76. 0	+12. 0	---	216
Oct. 1	12 1	8693	−68. 0	−14. 5	62	---
		8692	−22. 5	+17. 0	---	46
		8690	−21. 0	+11. 0	---	31
		8687	{+17. 0	−14. 5	---	62
			{+20. 0	−12. 0	---	401
			{+26. 0	− 9. 0	---	216
		8686	{+57. 5	+ 7. 5	---	31
			{+67. 5	+ 3. 0	15	---
		8691	+82. 0	+11. 0	---	247
2	11 59	8693	−55. 0	−14. 5	15	---
		8694	−27. 0	+18. 0	15	---
		8690	− 9. 5	+10. 5	6	---
		8692	− 8. 0	+15. 5	9	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
	h m		°	°		
1918 Oct. 2	11 59	8687	+30.5	−15.0	---	154
			+33.0	−12.0	---	340
			+40.0	− 9.0	201	---
		8686	+71.0	+ 7.5	---	108
4	12 1	8697	−78.0	+12.0	123	---
		8693	−28.0	−13.0	---	31
		8696	−11.5	−19.0	31	---
		8694	− 1.0	+18.0	---	15
		8690	+19.0	+10.0	---	31
		8687	+56.5	−16.0	---	93
			+62.0	−12.0	---	216
			+67.5	− 9.5	---	278
		8695	+85.0	+ 5.0	154	---
10	11 59	870c	−36.5	− 9.0	9	---
			−22.0	+17.5	---	15
		8700	−10.0	−12.0	---	22
		8697	− 7.5	+10.0	---	15
			− 0.5	+11.0	---	46
		8704	+ 2.5	+ 0.5	15	---
			+ 6.0	+ 1.0	15	---
		8701	+33.5	+ 6.0	---	31
		8702	+35.0	− 3.5	---	31
			+43.0	− 2.5	---	15
		8703	+37.0	+ 2.0	---	340
28	12 2	8728	−83.0	+ 7.5	309	---
		8727	−77.5	0.0	123	---
		8726	−48.0	−14.0	---	93
			−40.5	−13.0	---	77
		8725	−17.5	+22.0	154	---
		8724	−10.5	−18.5	---	231
		8721	+49.5	−19.0	---	216
		8719	+58.0	+ 3.0	---	77
			+62.5	+ 0.5	15	---
			+67.5	+ 3.5	---	93
31	12 2	8728	−42.5	+ 8.0	---	154
		8727	−38.5	+ 0.5	62	---
		8726	− 1.0	−13.0	---	139
		8725	+22.0	+22.5	31	---
		8724	+28.0	−19.0	---	62
		8729	+42.0	+11.0	---	31
Nov. 2	12 0		−74.0	+ 3.5	---	77
			−53.0	−19.0	31	---
		8728	−17.5	+ 8.0	---	93
		8727	−11.0	+ 0.5	77	---
		8726	+23.5	−15.5	---	15
			+30.0	−12.5	---	77
		8725	+48.0	+22.0	185	---
		8724	+55.0	−19.0	---	46
4	12 3	8728	+ 2.0	+ 8.5	---	31
			+ 4.0	+11.5	---	15
			+ 9.5	+ 8.0	---	62
			+10.0	+10.5	---	31
		8727	+16.0	0.0	62	---
		8724	+52.5	−17.0	6	---
		8726	+57.0	−12.5	77	---
		8725	+72.5	+22.0	154	---
6	11 56	8730	−12.0	+ 0.5	6	---
		8728	+35.0	+ 9.0	---	15

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
	h m		°	°		
1918 Nov. 6	11 56	8727	+42.0	0.0	62	---
		8731	+47.0	−20.0	---	93
7	11 57	871e	+43.0	+17.5	---	31
		8727	+56.0	0.0	62	---
		8731	+58.0	−20.0	---	154
8	12 5	8733	+ 1.0	+ 9.5	---	15
		8730	+19.0	+ 0.5	---	9
		8732	+25.0	+ 8.0	---	77
		8727	+70.0	0.0	62	---
		8731	+73.5	−20.0	---	216
11	12 3	8739	−77.0	+13.5	---	185
		8733	+44.5	+ 8.5	15	---
		8735	+61.5	+ 2.0	--	93
		8732	+63.0	+ 8.0	62	---
12	12 1	8739	−63.5	+13.5	---	401
			−52.0	+15.5	31	---
		8732	+77.0	+ 8.0	31	---
		8735	+78.0	+ 2.0	---	62
13	11 50	8742	−80.0	+ 8.0	370	---
		8741	−69.5	+ 7.5	31	---
		8739	−52.0	+13.5	---	370
		8740	−41.5	+15.5	15	---
23	12 10	8759	−57.0	−18.0	---	123
		8756	−41.5	− 9.5	---	154
		8755	−20.0	+10.0	31	---
		8757	−12.0	+17.0	---	15
		8750	+ 9.5	−20.0	---	46
			+17.5	−20.0	---	31
		8752	+23.0	+14.5	---	31
		8745	+30.5	−17.5	62	---
		8748	+40.5	− 9.0	---	31
		8742	+53.5	+ 8.0	15	---
			+58.5	+ 7.5	185	---
		8739	+84.0	+13.0	216	---
25	12 2	8760	−78.0	−19.0	77	---
			−72.0	−20.0	---	31
			−65.0	−20.0	---	77
		8759	−33.5	−18.5	---	15
			−28.0	−18.0	---	46
		8756	−17.0	− 9.0	---	463
		8755	+ 7.5	+ 9.0	15	---
		8745	+57.5	−17.5	62	---
26	12 26	8760	−64.0	−19.5	62	---
			−59.0	−20.0	---	46
			−52.0	−20.5	---	77
		8759	−17.5	−19.0	---	31
		8756	− 2.0	−10.5	---	525
		8755	+21.5	+ 8.5	15	---
		8745	+71.5	−17.5	62	---
27	11 56	8760	−51.0	−20.0	---	46
			−46.0	−20.0	---	31
			−39.0	−18.5	---	62
		8759	− 3.5	−19.0	---	31
		8756	+11.5	−11.0	---	525

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
	h m		°	°		
1918 Nov. 29	11 54	8760	−24.5	−19.5	---	31
			−18.5	−21.0	---	31
			−13.0	−20.5	46	---
			−12.0	−18.0	---	15
		8761	+12.0	−22.0	62	---
		8756	+38.5	−10.5	---	494
30	11 53	8760	−12.0	−20.0	15	---
			− 6.0	−21.0	---	46
			− 0.5	−18.0	---	93
		8761	+25.5	−22.0	93	---
		8756	+52.0	−10.5	802	---
Dec. 2	12 3	8762	−36.5	+12.5	---	62
		8763	− 3.5	−14.5	---	46
		8761	+52.5	−20.5	---	46
		8756	+80.0	−10.5	864	---
5	12 3	8762	+ 1.5	+12.0	---	46
			+ 8.0	+11.0	31	---
		8765	+22.0	−14.0	---	93
		8763	+37.0	−13.5	---	154
6	11 56	8766	−80.0	−11.0	401	---
		8765	+35.0	−14.0	---	123
		8763	+50.5	−13.5	---	93
12	11 59	8767	−17.0	− 5.5	---	123
		8766	+ 0.5	−10.5	---	278
		8769	+50.5	+16.0	---	123
23	12 6	8780	−36.0	−15.5	---	93
		8775	+ 0.5	− 7.5	---	525
		8776	+ 2.0	+11.5	37	---
		8774	+ 3.0	−20.5	---	123
		8773	+32.0	− 8.0	---	432
30	12 0	8784	−14.0	+12.5	31	---
		8788	− 3.0	−10.5	---	93
		8780	+68.0	−18.0	62	---
		8779	+69.0	−11.5	---	62
1919 Jan. 4	12 0	8791	−55.0	− 9.5	123	---
6	11 58	8794	−53.0	+10.0	---	123
		8791	−28.0	− 9.5	108	---
		8792	−20.5	+ 4.5	---	22
			−14.5	+ 2.0	---	15
10	12 0	8796	−68.0	−18.0	123	---
		8795	−10.5	+17.0	---	247
		8794	+ 4.5	+11.0	---	309
		8791	+24.0	− 9.5	93	---
11	11 54		−78.0	+10.0	15	---
		8798	−71.5	− 8.0	247	---
		8796	−55.0	−18.0	---	62
		8795	+ 2.0	+17.0	---	170
		8794	+18.0	+10.5	---	463
		8791	+37.5	− 9.5	46	---
		8797	+61.0	−19.0	---	46
13	11 58	8800	−67.5	+14.0	---	93
		8798	−45.0	− 8.0	154	---
		8796–99	−30.0	−18.0	---	62

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1919	h m		°	°		
Jan. 13	11 58	8795	+28.0	+17.0	---	154
		8794	+45.0	+10.5	---	494
16	11 55	8804	−67.0	+19.5	31	---
		8802	−54.0	− 7.0	31	---
		8801	−47.0	−21.0	31	---
		8800	−31.5	+12.5	22	---
			−24.0	+12.0	31	---
		8803	−16.5	−17.5	---	46
		8798	− 3.5	− 8.0	170	---
		8795	+62.0	+17.5	---	93
		8794	+85.0	+11.0	---	309
20	11 54	8811	−85.0	−13.0	---	154
		8810	−67.5	+ 8.5	---	31
		874a	− 0.5	+19.5	---	9
		8800	+24.0	+ 9.0	3	---
			+26.0	+15.5	---	31
			+30.5	+12.0	15	---
		8798	+48.5	− 7.5	---	46
			+52.5	+ 9.0	---	6
21	12 0	8811	−71.0	−12.0	108	---
		8810	−53.0	+ 8.0	6	---
		8800	+43.0	+12.0	9	---
		8798	+60.5	− 7.5	62	---
25	12 0	8811	−17.5	−14.5	62	---
27	12 0	8811	+12.0	−13.5	---	93
		8815	+21.5	− 7.5	---	108
			+28.0	− 7.5	---	170
28	12 3	8811	+23.0	−14.0	---	93
		8815	+36.0	− 7.5	---	123
			+42.5	− 7.5	---	154
		8814	+41.0	−13.0	---	62
30	11 55	8817	+18.0	+24.5	---	93
		8811	+50.0	−14.0	62	---
		8815	+62.0	− 7.0	---	185
			+71.0	− 6.5	278	---
		8814	+63.0	−13.5	31	---
31	11 57	8818	−75.0	− 5.0	93	---
			−67.5	− 7.5	---	62
		8819	−72.5	+ 8.5	---	123
			−64.0	+ 9.0	---	123
		8817	+32.0	+26.0	---	62
			+35.0	+23.0	---	62
		8811	+63.0	−14.0	62	---
		8815	+85.0	− 7.0	---	309
Feb. 1	12 0	8821	−78.0	+15.0	---	370
		8820	−69.0	−13.0	---	93
		8818	−63.0	− 6.5	---	108
			−52.0	− 7.5	---	31
		8819	−57.5	+ 8.5	---	340
			−47.5	+ 8.5	---	154
		8822	+31.0	+ 9.0	15	---
		8817	+42.0	+26.0	---	93
			+48.0	+22.5	---	154
		8811	+77.0	−14.5	46	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1919	h m		°	°		
Feb. 3	11 52	8824	−59. 0	+15. 5	---	278
		8821	−53. 0	+13. 0	---	309
		8820	−41. 5	−13. 0	---	123
		8818	−31. 5	− 7. 0	---	93
			−20. 5	− 7. 5	62	---
		8819	−28. 0	+ 8. 5	---	340
			−18. 5	+ 9. 0	46	---
		8822	+59. 0	+ 8. 5	---	216
5	11 58	8824	−32. 5	+15. 5	---	309
		8821–23	−27. 0	+13. 0	---	370
			−21. 5	+15. 5	---	46
		8820	−14. 5	−13. 0	---	93
		8819	− 6. 0	+ 8. 0	---	216
			+ 2. 5	+ 9. 0	---	154
			+ 9. 5	+ 9. 0	---	31
		8818	− 4. 5	− 7. 5	---	123
			+ 6. 0	− 7. 5	---	46
6	11 58	8829	−80. 0	+12. 5	---	154
		8824	−18. 5	+15. 5	---	216
		8821–23	−13. 0	+12. 0	---	370
			−12. 0	+14. 5	---	123
			− 8. 0	+15. 0	---	15
		8820	− 1. 0	−13. 0	93	---
		8819	+ 9. 0	+ 7. 5	---	185
			+17. 0	+ 9. 0	---	123
		8818	+10. 0	− 7. 5	---	46
			+19. 0	− 7. 0	---	31
		8825	+71. 0	+12. 0	62	---
7	12 7	8829	−64. 0	+12. 5	---	123
		8824	− 5. 0	+14. 5	---	216
		8828	− 3. 5	+21. 0	---	31
		8821–23	+ 1. 0	+12. 5	---	401
		8820	+12. 5	−13. 5	62	---
		8819	+22. 0	+ 7. 0	---	185
			+28. 0	+ 8. 5	---	108
		8818	+25. 0	− 7. 5	---	15
			+33. 0	− 7. 0	15	---
8	11 57	8833	−77. 5	+ 9. 5	---	494
		8829	−50. 5	+12. 5	---	62
		8824	+ 8. 0	+14. 5	---	170
		8828	+10. 0	+21. 0	---	93
		8823	+15. 0	+12. 5	---	463
		8820	+26. 0	−14. 5	62	---
		8819	+37. 0	+ 7. 0	---	123
			+43. 0	+ 8. 5	---	123
		8818	+45. 0	− 7. 5	---	15
11	11 54	8833	−49. 0	+10. 5	46	---
			−43. 0	+10. 0	---	247
			−33. 0	+ 9. 5	432	---
		8829	− 7. 0	+11. 5	---	31
		8828	+47. 5	+22. 0	31	---
		8824	+50. 5	+14. 0	---	154
		8823	+55. 0	+12. 0	---	93
		8820	+65. 0	−15. 0	46	---
12	11 53	8833	−35. 0	+10. 5	31	---
			−29. 5	+10. 0	340	---
			−20. 0	+ 9. 5	556	---
		8829	+ 7. 5	+12. 0	---	46
		8823	+67. 0	+12. 5	---	123

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1919	h m		°	°		
Feb. 14	11 51	8833	− 7. 0	+10. 0	---	278
			+ 7. 0	+10. 0	463	---
		8829	+33. 0	+12. 0	---	46
17	12 0	8837	−67. 5	+10. 0	---	31
			−62. 5	+ 9. 5	40	---
		8834	−46. 0	− 5. 0	108	---
		8833	+36. 0	+ 9. 5	---	139
			+47. 0	+10. 0	---	463
18	11 56	8837	−54. 0	+10. 0	22	---
			−49. 0	+ 9. 5	40	---
		8834	−32. 0	− 5. 0	108	---
		8833	+50. 0	+ 9. 0	123	---
			+59. 0	+10. 0	---	432
19	11 56	8837	−39. 5	+10. 0	15	---
			−35. 0	+ 9. 5	31	---
		8834	−19. 0	− 5. 0	108	---
		8833	+62. 0	+ 9. 0	---	62
			+72. 5	+10. 0	---	370
20	11 59	8837	−21. 0	+10. 0	31	---
		8834	− 5. 5	− 5. 0	108	---
		8838	+13. 0	−10. 5	---	31
24	11 59	8842	−80. 0	+ 9. 0	247	---
		8839	−48. 5	+12. 5	---	154
		8840	− 7. 5	+22. 5	---	46
		8837	+32. 5	+10. 0	15	---
		8834	+48. 0	− 5. 0	93	---
26	11 56	8843	−64. 5	−18. 5	---	154
		8842	−60. 0	+ 9. 5	---	154
			−56. 0	+ 8. 5	---	247
		8839	−22. 5	+12. 5	154	---
		8840	+21. 0	+22. 5	---	46
		8834	+75. 0	− 5. 0	123	---
Mar. 1	11 57	8843	−24. 0	−18. 5	---	108
		8842	−13. 5	+ 8. 0	---	154
		8845	− 9. 0	− 6. 0	---	93
		8839	+16. 0	+13. 5	139	---
3	11 54	8843	+ 0. 5	−19. 5	---	46
			+ 9. 5	−18. 0	31	---
		8842	+12. 5	+ 8. 0	123	---
		8845	+20. 5	− 7. 5	---	31
		8839	+41. 5	+14. 0	---	185
4	11 53	8850	−75. 0	+ 9. 0	185	---
		8843	+22. 5	−18. 0	46	---
		8842	+27. 0	+ 8. 0	123	---
		8849	+47. 5	− 8. 0	9	---
		8839	+54. 5	+14. 0	123	---
6	11 53	8850	−54. 0	+ 8. 5	---	247
			−48. 0	+ 9. 0	---	123
			−44. 5	+ 9. 0	---	247
		8851	+32. 0	+16. 5	---	46
		8842	+53. 0	+ 7. 5	---	139
		875f	+69. 5	− 4. 0	---	31
		8849	+76. 0	− 7. 5	15	---
		8839	+85. 0	+14. 0	123	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic: Diff. Long.	Heliographic: Lat.	Area: Spot	Area: Group
1919	h m		°	°		
Mar. 7	11 59	8853	−77. 0	+11. 5	216	---
			−69. 0	+ 8. 5	---	247
		8850	−41. 0	+ 8. 5	---	185
			−35. 5	+ 9. 0	---	108
			−30. 5	+ 9. 0	247	---
		8842	+67. 5	+ 7. 5	108	---
8	12 5	8853	−63. 5	+11. 5	---	216
			−56. 0	+ 8. 5	---	247
		8850	−27. 5	+ 9. 0	---	216
			−19. 0	+ 8. 5	---	556
		8842	+83. 0	+ 8. 0	154	---
10	11 54	8856	−88. 0	−18. 5	---	309
			−75. 0	−18. 5	154	---
		8855	−77. 5	+17. 5	---	247
			−70. 5	+17. 0	216	---
		8854	−63. 5	−12. 0	15	---
		8853	−35. 0	+10. 5	---	247
			−27. 0	+ 8. 0	---	123
		8850	+ 3. 5	+ 9. 0	---	247
			+10. 0	+ 7. 5	247	---
11	11 54	8856	−73. 0	−17. 5	201	---
			−62. 0	−19. 0	---	154
		8855	−63. 5	+17. 5	---	370
			−57. 0	+17. 0	216	---
		8854	−50. 0	−12. 0	---	15
		8853	−22. 0	+10. 5	---	231
			−12. 0	+ 8. 5	---	154
		8850	+12. 5	+ 8. 0	---	123
			+18. 0	+10. 5	---	93
			+23. 0	+ 7. 5	247	---
12	11 55	8856	−60. 0	−17. 5	185	---
			−60. 0	−19. 5	---	31
			−48. 5	−19. 0	---	154
		8855	−50. 0	+17. 5	---	247
			−42. 5	+17. 0	---	185
			−36. 5	−17. 5	---	15
		8853	−10. 5	+10. 5	123	---
			− 7. 0	+ 9. 5	---	77
			+ 2. 0	+ 8. 0	154	---
		8850	+27. 5	+ 9. 5	---	185
			+37. 5	+ 8. 5	247	---
17	11 50	8858	−33. 5	− 6. 5	62	---
		8856	+ 3. 5	−18. 0	---	31
			+16. 0	−19. 0	201	---
		8855	+17. 0	+19. 0	---	108
			+24. 0	+18. 5	46	---
		8859	+28. 0	+ 3. 0	---	46
		8853	+55. 0	+10. 5	123	---
			+70. 0	+ 8. 5	278	---
18	11 51	8858	−20. 0	− 6. 5	77	---
		8856	+17. 0	−19. 0	---	31
			+29. 0	−19. 0	154	---
		8855	+29. 5	+18. 5	---	93
			+32. 5	+17. 5	---	15
			+38. 0	+19. 0	62	---
		8859	+43. 0	+ 2. 5	---	108
		8853	+68. 0	+10. 5	185	---
			+85. 0	+ 8. 0	247	---
1919	h m		°	°		
Mar. 20	11 55	8858	+ 7. 5	− 7. 0	46	---
		8856	+54. 5	−19. 0	170	---
		8855	+56. 0	+19. 0	15	---
			+65. 0	+19. 5	62	---
		8859	+67. 5	+ 3. 0	6	---
21	11 53	8860	−79. 0	− 7. 0	46	---
		8858	+20. 0	− 7. 0	40	---
		8856	+68. 5	−18. 5	123	---
		8855	+79. 0	+19. 0	77	---
24	11 53	8862	−76. 0	−20. 5	---	93
			−63. 0	−19. 5	401	---
		8863	−71. 5	−17. 5	93	---
		8864	−59. 5	+ 4. 5	15	---
		8861	−40. 5	+14. 5	31	---
		8860	−37. 0	− 7. 0	---	19
		8858	+60. 0	− 6. 5	15	---
25	11 55	8866	−67. 0	+ 7. 0	31	---
		8862	−61. 0	−20. 5	---	93
			−49. 5	−20. 0	340	---
		8863	−58. 0	−17. 5	77	---
		8864	−44. 0	+ 4. 5	31	---
		8861	−28. 0	+14. 5	22	---
26	11 56	8862	−49. 0	−20. 5	---	15
			−37. 5	−19. 5	309	---
		8863	−47. 0	−17. 5	---	77
28	11 59	8869	−58. 0	−20. 0	154	---
		8868	−21. 5	− 0. 5	31	---
		8863	−19. 5	−17. 5	---	77
		8862	− 9. 0	−19. 0	247	---
29	12 4	8869	−45. 0	−20. 0	108	---
		8868	− 8. 0	− 0. 5	22	---
		8863	− 6. 5	−16. 0	40	---
		8862	+ 2. 5	−19. 5	---	309
31	11 45	8871	−68. 0	+ 7. 5	247	---
		8869	−19. 0	−20. 0	46	---
		8866	+ 9. 0	+ 7. 5	---	31
		8862	+27. 0	−21. 5	15	---
			+30. 5	−19. 5	262	---
Apr. 2	12 2	8872	−43. 0	−12. 5	---	108
		8871	−42. 0	+ 7. 0	170	---
		8869	+ 7. 5	−19. 5	---	46
		8866	+39. 0	+ 7. 5	---	46
		8862	+57. 0	−19. 5	231	---
3	11 53	8874	−62. 5	+10. 0	15	---
		8875	−31. 5	− 3. 0	---	46
		8871	−29. 5	+ 6. 5	---	231
		8872	−29. 0	−12. 5	---	77
		8869	+19. 5	−20. 0	15	---
		8866	+49. 0	+ 7. 0	---	46
		8862	+70. 0	−20. 0	278	---
8	11 51	8879	−39. 5	− 8. 5	6	---
		8878	−19. 0	+15. 0	---	278
			+20. 0	+10. 0	9	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1919	h m		°	°		
Apr. 8	11 51	8871	+38. 0	+ 7. 5	---	185
			+40. 0	+ 3. 5	---	15
		8875	+39. 5	− 7. 0	---	31
9	11 53	8878	− 6. 0	+15. 0	---	309
		8877	+23. 0	+10. 0	6	---
		8871	+50. 5	+ 7. 5	---	154
		8875	+53. 5	− 4. 5	---	31
19	11 54	8884	−78. 0	−19. 0	185	---
		8881	+45. 0	+ 3. 5	---	62
21	11 54	8884	−54. 0	−22. 0	---	15
			−52. 5	−19. 0	185	---
		8885	−30. 5	−14. 0	---	77
22	11 55	8884	−40. 5	−19. 0	154	---
		8885	−19. 5	−15. 0	---	123
			−14. 0	−13. 0	---	77
23	11 58	8884	−27. 5	−19. 0	154	---
		8885	− 7. 5	−15. 5	---	62
			− 1. 0	−14. 0	---	77
		8886	+11. 0	+15. 0	---	31
25	11 55	8888	−73. 0	−11. 0	---	340
		8884	− 1. 5	−19. 5	154	---
		8887	+ 5. 0	−19. 5	---	46
		8885	+21. 0	−15. 0	---	62
			+28. 5	−13. 0	---	77
		8886	+37. 5	+14. 5	---	340
29	11 58	8890	−52. 5	−20. 5	154	---
			−47. 0	−18. 0	---	108
		8889	−42. 5	+ 8. 0	123	---
		8888	−22. 0	−11. 5	---	93
			−13. 5	−10. 5	---	139
		8884	+52. 0	−19. 5	247	---
		8887	+65. 0	−20. 0	31	---
30	12 2	8890	−40. 0	−20. 5	154	---
			−31. 0	−18. 0	---	139
		8889	−29. 5	+ 8. 0	123	---
		8888	− 8. 0	−11. 5	---	31
			− 1. 0	−10. 0	---	154
		8884	+65. 0	−19. 5	154	---
May 2	11 51	8893	−70. 5	− 5. 0	154	---
		8892	−63. 0	−15. 0	6	---
		8890	−12. 0	−20. 5	---	123
			− 3. 5	−18. 0	216	---
		8889	− 3. 0	+ 8. 0	123	---
		8888	+21. 0	−11. 5	---	46
			+27. 5	−10. 5	---	93
3	11 54	8895	−82. 5	+ 7. 0	---	246
			−72. 0	+ 8. 0	---	370
		8893	−57. 5	− 5. 0	154	---
		8892	−49. 5	−15. 0	6	---
		8890	+ 1. 0	−20. 5	---	154
			+ 9. 5	−18. 5	---	154
		8889	+11. 0	+ 7. 5	---	123
		8888	+33. 5	−12. 5	---	31
			+40. 0	−11. 5	---	123
		8894	+50. 0	−15. 0	---	31

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1919	h m		°	°		
May 5	11 53	8896	−52. 5	+13. 5	---	62
		8895	−54. 0	+ 7. 0	---	185
			−47. 0	+ 7. 0	---	494
		8893	−30. 5	− 5. 5	---	154
		8890	+27. 5	−20. 5	---	46
			+34. 0	−19. 0	---	154
		8889	+37. 5	+ 7. 0	108	---
		8888	+68. 0	−10. 5	---	123
12	11 57	8899	−13. 0	− 7. 5	---	31
		8898	− 9. 0	− 6. 0	6	---
			− 5. 0	− 8. 0	---	46
			− 1. 0	− 9. 0	---	46
		8897	+ 4. 0	−20. 0	9	---
			+ 7. 5	−18. 0	154	---
		8896	+42. 0	+14. 0	---	77
		8895	+49. 0	+ 8. 0	340	---
		8893	+63. 0	− 5. 0	154	---
13	11 54	8900	−72. 0	+14. 0	---	617
		8898	+ 8. 0	−15. 0	---	31
			+12. 0	− 9. 0	---	62
		8897	+20. 0	−18. 0	123	---
		8896	+51. 0	+14. 5	31	---
			+59. 0	+14. 0	31	---
		8895	+62. 5	+ 8. 0	309	---
		8893	+78. 0	− 5. 0	---	123
15	12 10	8901	−80. 0	− 5. 0	154	---
			−73. 0	− 5. 0	---	247
		8900	−46. 0	+14. 5	---	802
		8897	+33. 5	−17. 0	---	15
			+47. 0	−18. 0	108	---
19	11 55	8905	−54. 5	−14. 0	31	---
		8903	−49. 5	−20. 0	62	---
		8906	−42. 0	−15. 5	6	---
		8901	−21. 0	− 5. 0	---	216
		8902	−20. 0	− 9. 0	---	185
		8900	+ 8. 0	+15. 0	---	926
22	12 5	8905	−22. 0	−13. 0	---	46
			−16. 0	−12. 5	---	62
		8903	−10. 5	−20. 0	31	---
		8901	+13. 5	− 7. 0	---	46
			+19. 0	− 9. 0	---	77
		8902	+23. 0	− 6. 0	---	108
			+26. 0	− 8. 0	108	---
		8900	+47. 0	+14. 5	---	833
23	11 59	8905	−10. 0	−12. 0	---	15
			− 3. 5	−12. 5	---	62
		8903	+ 1. 5	−20. 0	31	---
		8907	+17. 5	−18. 5	---	31
		8901	+28. 0	− 7. 0	---	31
		8902	+36. 5	− 6. 0	---	201
		8900	+57. 5	+15. 0	---	679
			+64. 0	+13. 5	---	154
26	11 57	8909	−43. 5	+10. 0	93	---
		8912	−24. 0	−10. 5	---	46
		8908	+35. 0	− 5. 5	---	46
		8910	+37. 0	−19. 5	---	93
		8907	+58. 0	−18. 5	---	216
		8902	+85. 0	− 6. 0	154	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1919	h m		°	°		
May 27	11 55	8909	−30.0	+10.0	93	---
		8912	−12.0	−10.5	---	46
		8908	+46.0	− 5.5	31	---
		8910	+48.0	−19.5	---	62
		8907	{+69.0	−19.0	---	77
			{+75.0	−18.5	216	---
28	12 16	8909	−17.0	+10.5	93	---
		8912	+ 3.0	−10.5	---	31
		8908	+59.5	− 5.0	31	---
			+60.0	+16.0	46	---
		8907	+85.0	−19.5	---	231
29	11 58	8918	−85.0	+17.5	309	---
		8914	−22.5	− 7.0	---	62
		8909	− 3.0	+10.5	62	---
June 2	11 57	8920	{−62.5	− 7.0	108	---
			{−58.5	− 8.0	93	---
		8919	{−39.0	+18.5	---	6
			{−38.0	+23.5	---	15
		8918	−32.0	+17.0	46	---
		8917	−29.5	+ 7.5	154	---
		8916	+11.5	+11.5	---	46
		8915	{+20.5	+15.5	---	46
			{+26.0	+13.5	---	31
		8914	+32.5	− 7.5	---	185
		8909	+49.0	+10.5	77	---
3	12 1	8920	{−49.0	− 6.5	---	108
			{−44.5	− 8.0	77	---
		8921	−40.0	−19.5	9	---
		8919	−24.0	+23.5	---	31
		8918	−19.0	+16.5	31	---
		8917	−17.0	+ 7.5	139	---
		8916	+24.0	+12.0	---	31
		8915	{+33.0	+14.5	---	22
			{+40.0	+14.0	6	---
		8914	+46.0	− 7.5	---	185
		8909	+62.0	+10.5	93	---
4	11 59	8923	−43.0	−12.0	---	31
		8920	−33.5	− 7.0	---	123
		8921	−27.5	−19.5	15	---
		8919	−12.5	+23.0	---	185
		8918	− 6.0	+15.5	31	---
		8917	− 3.0	+ 7.5	154	---
		8922	+35.0	+ 7.5	---	62
		8916	+40.0	+12.0	---	9
		8915	+46.0	+14.5	6	---
		8914	+60.0	− 7.5	---	370
		8909	+75.0	+10.0	77	---
7	12 22	8920	{+ 9.5	−10.0	---	31
			{+13.0	− 9.5	9	---
		8919	{+23.5	+25.5	---	77
			{+30.5	+22.0	---	185
		8925	+24.0	− 9.0	---	123
		8918	+33.0	+16.0	6	---
		8917	+37.5	+ 7.5	123	---
		8922	{+73.0	+ 7.0	---	185
			{+85.0	+ 5.0	154	---
13	11 59	8935	−63.0	−17.5	648	---
		8937	−47.0	− 4.5	---	62
		8932	−34.5	− 8.0	31	---
1919	h m		°	°		
June 13	11 59	8931	−31.5	−16.5	---	77
		8928	{−31.0	+14.0	---	46
			{−24.0	+12.5	---	401
		8936	− 2.0	+11.5	---	31
		8929	+63.0	+14.0	62	---
		8926	+66.0	−16.5	---	31
16	11 51	8940	−53.5	+ 9.0	---	154
		8935	−24.0	−17.0	---	679
		8937	− 6.0	− 5.5	---	31
		8932	+ 8.0	− 9.5	31	---
		8928	{+13.0	+13.5	123	---
			{+17.5	+11.5	---	309
17	11 53	8940	−38.0	+ 8.5	---	278
		8935	−12.0	−17.5	---	802
		8932	{+18.0	− 8.5	---	15
			{+21.0	−10.0	31	---
		8928	{+22.0	+13.5	---	46
			{+27.5	+14.0	154	---
			{+32.0	+12.0	---	247
19	11 57	8944	{−22.5	+10.0	---	46
			{−17.5	+ 9.0	---	31
		8940	− 9.0	+ 8.0	---	185
		8935	+17.0	−17.0	---	710
		8943	+23.0	+12.5	---	201
		8931	+47.0	−19.0	31	---
		8928	{+52.0	+14.0	154	---
			{+57.5	+12.0	---	216
20	11 57	8942	−22.0	− 8.5	---	15
			−12.0	−18.0	---	9
		8944	{− 9.5	+10.0	---	46
			{− 3.0	+ 9.0	---	31
		8940	+ 4.0	+ 8.0	---	154
		8935	+29.5	−17.0	---	741
		8943	{+31.0	+12.5	123	---
			{+38.5	+12.0	---	123
		8928	{+65.0	+14.5	154	---
			{+70.0	+12.5	---	185
23	11 59	8952	−61.5	+ 2.5	123	---
		8949	−50.0	− 9.0	---	231
		8948	−13.5	−12.0	---	62
		8947	− 9.5	− 7.5	---	15
		8950	− 3.5	+12.0	---	62
		8942	+18.5	− 8.5	---	123
		8945	+28.0	−17.5	---	62
		8940	+42.0	+ 7.5	---	139
		8935	+68.0	−17.5	---	617
		8943	+69.5	+14.0	---	93
28	11 50	8958	−41.5	+ 9.0	31	---
		8961	−20.0	−20.0	---	15
		8952	+ 7.0	+ 3.5	108	---
		8959	+14.0	− 4.0	---	31
		8949	+19.5	− 9.0	---	154
		8948	+54.0	−12.5	---	309
		8947	+61.0	− 7.5	---	216
		8950	+61.0	+14.0	---	93
		8955	+64.0	+ 7.5	---	216
30	11 57	8962	−62.0	− 9.0	---	77
			−42.0	+ 8.5	31	---
		879p	−34.0	+ 5.0	---	31

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1919	h m		°	°		
June 30	11 57	8958	−15.5	+9.0	31	---
		8952	+32.5	+4.5	93	---
		8949	+47.5	−9.0	---	185
July 1	12 26	8962	−48.0	−8.5	---	31
		8958	−1.5	+9.0	15	---
		8957	+24.0	−14.5	---	15
		8960	+30.5	+5.5	9	---
		8952	+47.0	+4.5	108	---
		8949	+62.0	−9.5	---	154
2	11 58	8965	−79.5	+8.5	93	---
		8964	−71.0	+9.0	---	62
		8962	−37.0	−8.5	---	46
		8958	+11.5	+9.5	9	---
		8963	+15.0	−9.0	---	15
		8957	+37.5	−14.5	---	62
		8960	+42.0	+5.0	---	9
		8952	+59.0	+4.5	93	---
		8949	+73.0	−10.0	---	185
3	11 57	8965	−74.0	+10.5	123	---
			−66.5	+9.0	93	---
		8964	−57.5	+9.0	---	46
		8962	−23.0	−8.5	---	62
		8963	+28.0	−8.5	---	46
		8957	+51.0	−15.0	---	216
		8952	+71.5	+5.0	123	---
5	11 37	8965	−44.5	+9.5	---	154
		8964	−32.5	+8.0	---	62
			−28.0	+8.5	154	---
8	11 58		−20.0	−10.0	---	15
		8965	−10.0	+11.0	62	---
			−2.5	+8.0	---	9
			−1.0	+9.0	31	---
		8964	+12.0	+9.5	139	---
			+37.0	+4.5	31	---
11	11 52	8969	−75.0	+7.0	31	---
		8967	−50.5	−14.5	---	93
		8966	−33.0	−8.0	---	154
		8964	+52.0	+10.0	139	---
21	12 2	8981	−69.0	−12.0	---	154
		8979	−59.0	−11.5	---	93
		8977	−34.5	−9.5	77	---
		8973	+3.0	−14.0	123	---
		8972	+12.0	−8.5	---	15
		8971	+16.0	+7.5	62	---
24	11 57	8981	−38.0	−18.5	---	15
			−32.0	−12.5	---	201
		8979	−20.5	−12.0	---	62
		8982	+2.0	+11.5	---	31
		8977	+7.0	−10.0	108	---
		8973	+36.0	−20.0	62	---
			+39.5	−17.5	---	15
			+43.5	−14.5	139	---
		8971	+54.0	+7.5	46	---
25	11 58	8986	−68.0	−19.5	31	---
		8981	−19.0	−13.0	---	154
		8979	−8.0	−13.0	---	46
1919	h m		°	°		
July 25	11 58	8982	+15.5	+11.0	---	40
		8977	+19.5	−10.5	123	---
		8978	+32.0	+3.0	---	15
		8973	+49.0	−20.5	---	46
			+57.5	−14.5	201	---
		8971	+68.0	+7.0	62	---
26	11 46		−66.0	+29.5	31	---
		8986	−57.5	−19.0	---	46
		8981	−6.0	−12.5	---	123
		8979	+7.0	−13.0	31	---
		8982	+28.5	+11.0	---	31
		8977	+32.5	−10.5	108	---
		8978	+47.0	+4.0	---	46
		8973	+63.0	−20.5	---	15
			+71.5	−15.0	123	
28	11 53	8988	−79.0	+7.0		123
		8981	+21.0	−12.5	123	---
		8979	+32.0	−11.5	---	15
		8977	+60.0	−10.5	123	---
29	11 57	8988	−67.5	+8.0	---	108
		8981	+34.0	−12.0	93	---
		8977	+73.0	−11.5	93	---
30	11 54	8988	−54.5	+8.0	---	62
		8981	+47.5	−12.0	108	---
Aug. 1	11 57	8991	−52.0	−17.0	19	---
		8981	+74.0	−13.0	93	---
2	11 45	8991	−38.0	−17.5	19	---
4	11 58	8996	−73.5	−10.0	108	---
		8994	−60.0	−7.0	370	---
		8991	−13.0	−16.0	---	31
			−21.5	−16.0	---	15
11	11 57	9002	−80.0	−13.0	93	---
		9000	−18.0	−8.0	---	247
		8998	+4.5	−9.0	6	---
		8996	+17.5	−10.0	---	216
		8994	+32.5	−8.5	278	---
			+33.5	−4.0	15	---
15	12 18	9008	−78.0	−10.5	123	---
		9005	−58.0	+5.5	---	247
			−47.5	+3.0	---	370
		9007	−48.0	−3.5	---	247
		9002	−27.0	−15.0	46	---
		9000	+36.0	−8.5	154	---
		8998	+57.0	−10.0	---	31
		8996	+73.0	−10.0	---	93
18	12 7	9010	−48.0	−10.5	22	---
		9008	−37.5	−10.0	62	---
		9005	−17.5	+5.5	---	247
			−7.0	+2.5	---	370
		9007	−15.0	−5.0	---	154
			−6.5	−2.5	---	247
		9002	+12.5	−15.5	46	---
		9000	+75.0	−9.0	123	---
19	12 7	9010	−34.5	−11.0	15	---
		9008	−24.0	−10.0	77	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1919	h m		°	°		
Aug. 19	12 7	9005	−3. 5	+ 5. 5	---	216
			+ 8. 0	+ 2. 0	401	---
		9007	− 1. 5	− 5. 5	---	154
			+ 7. 5	− 2. 0	---	340
		9011	+ 1. 5	+10. 0	---	62
		9002	+25. 5	−16. 0	31	---
20	12 4	9015	−83. 0	−17. 0	154	---
		9008	−10. 0	− 9. 5	62	---
		9005	+ 8. 0	+ 6. 0	---	93
			+22. 0	+ 2. 0	432	---
		9007	+12. 0	− 4. 0	---	93
			+21. 0	− 2. 0	---	586
		9011	+15. 0	+10. 0	---	123
		9002	+39. 0	−16. 5	31	---
22	12 12	9016	−75. 0	− 7. 5	15	---
		9015	−58. 0	−17. 5	---	154
		9008	+17. 5	− 9. 5	---	77
		9011	+34. 5	+ 6. 0	---	46
			+39. 0	+11. 5	---	31
			+47. 0	+10. 0	93	---
		9014	+42. 0	+17. 0	---	31
		9007	+47. 5	− 2. 0	---	648
		9005	+48. 0	+ 2. 0	---	463
		9013	+59. 5	+23. 0	---	31
25	12 5	9018	−60. 0	+ 4. 0	---	15
		9016	−34. 0	− 7. 0	15	---
		9015	−17. 5	−17. 5	---	46
		9017	−12. 0	− 8. 0	---	185
		9010	+44. 0	−12. 0	---	15
		9008	+57. 5	− 9. 5	---	31
27	12 10	9019	−67. 0	−19. 5	---	31
		9015	+10. 5	−17. 0	31	---
		9017	+11. 5	− 9. 0	---	108
			+18. 0	− 8. 0	139	---
29	12 16	9019	−38. 0	−19. 0	---	31
		9015	+37. 5	−17. 0	15	---
		9017	+38. 5	− 9. 0	---	62
			+46. 5	− 7. 5	123	---
Sept. 3	12 5	9025	−71. 0	− 8. 0	15	---
			−67. 5	+16. 0	---	31
		9021	−18. 5	− 8. 0	15	---
		9024	+ 2. 5	+11. 0	---	15
		9020	+24. 0	−17. 5	---	309
		9022	+65. 0	−20. 0	15	---
5	12 3	9024	+31. 0	+10. 5	---	62
		9020	+49. 0	−17. 5	---	494
8	11 55	9031	−83. 0	+ 1. 0	463	---
		9030	−80. 5	− 2. 0	247	---
		9027	−56. 0	−20. 0	---	31
			−53. 0	−17. 5	93	---
		9028	+50. 0	−20. 0	46	---
11	12 3	9031	−42. 0	+ 1. 0	401	---
		9030	−38. 5	− 2. 0	278	---
		9029	−29. 0	− 9. 5	---	46
		9027	−14. 0	−18. 5	---	123
			−12. 0	−17. 5	77	---
1919	h m		°	°		
Sept. 12	12 2	9031	−28. 5	+ 1. 0	278	---
		9030	−27. 0	− 2. 0	247	---
			− 7. 0	+11. 5	46	---
		9027	− 2. 0	−19. 0	---	62
			+ 0. 5	−17. 0	62	---
			+ 3. 5	−18. 5	93	---
13	11 41	9031	−17. 0	+ 1. 0	309	---
		9030	−12. 5	− 2. 0	247	---
		9027	+12. 0	−19. 0	---	62
			+14. 0	−17. 0	77	---
			+18. 0	−18. 5	108	---
15	12 5	9031	+12. 0	+ 0. 5	340	---
		9030	+13. 5	− 2. 0	231	---
		9029	+29. 0	− 9. 5	---	15
		9027	+38. 0	−20. 5	---	40
			+41. 0	−17. 0	93	---
			+47. 5	−18. 5	123	---
16	11 55	9031	+26. 0	+ 0. 5	340	---
		9030	+27. 5	− 2. 0	231	---
		9027	+54. 0	−17. 0	93	---
			+60. 0	−18. 5	62	---
18	11 59	9036	−80. 0	−15. 0	---	62
			−72. 0	−16. 0	---	170
			−67. 0	−17. 0	15	---
		9031	+52. 0	+ 1. 0	309	---
		9030	+53. 5	− 2. 0	---	216
20	11 53	9038	−75. 0	+11. 0	---	309
		9036	−50. 5	−15. 0	46	---
			−45. 0	−16. 0	---	77
		9037	−38. 0	− 7. 0	---	62
		9031	+80. 0	0. 0	247	---
		9030	+85. 0	− 2. 0	---	216
24	12 0	9040	−61. 0	−12. 5	154	---
		9039	−56. 5	−16. 5	---	93
			−48. 0	−16. 5	123	---
		9038	−28. 0	+12. 0	---	93
			−21. 5	+10. 0	---	216
		9036	+ 4. 0	−17. 0	---	77
		9037	+14. 0	− 7. 5	---	15
25	12 0	9041	−83. 0	− 9. 0	309	---
		9040	−47. 5	−13. 0	123	---
		9039	−42. 0	−16. 0	---	93
			−34. 0	−17. 0	62	---
		9038	−12. 0	+12. 0	---	62
			− 7. 5	+10. 0	---	201
		9036	+20. 5	−17. 0	---	15
		9037	+29. 0	− 8. 5	---	15
26	11 57	9041	−68. 0	− 9. 0	216	---
		9040	−34. 0	−12. 5	123	---
		9039	−30. 0	−15. 5	---	93
			−20. 5	−17. 0	46	---
		9038	+ 7. 0	+10. 0	---	185
27	12 24	9043	−78. 0	−15. 0	---	62
		9041	−56. 0	− 9. 0	185	---
		9040	−20. 0	−14. 0	---	154
		9039	− 7. 5	−17. 0	---	46

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1919	h m		°	°		
Sept. 27	12 24		+ 9.5	+14.5	---	15
		9038	+20.5	+10.0	---	154
		9036	+48.0	−17.0	---	9
			+54.0	+ 8.5	---	15
29	11 56	9045	−50.0	+ 2.0	9	---
		9043	−55.0	−15.0	---	62
			−47.5	−16.5	---	123
		9041	−29.5	− 9.0	185	---
		9040	+ 7.0	−12.5	123	---
		9039	+19.5	−17.0	---	31
		9038	+47.0	+10.0	---	185
30	12 3	9043	−41.0	−15.5	---	62
			−32.0	−17.0	---	77
		9041	−17.5	− 9.0	---	278
		9040	+20.5	−12.5	123	---
		9038	+60.0	+10.0	---	123
Oct. 3	11 53	9043	+ 0.5	−17.0	---	15
			+10.5	−17.0	108	---
		9041	+22.0	− 9.5	216	---
		9040	+60.0	−12.5	123	---
4	11 52	9043	+22.5	−17.0	---	123
		9041	+35.5	−10.0	---	93
		9040	+72.5	−13.0	---	154
7	11 58	9049	−80.0	+10.5	93	---
		9048	−65.0	−15.0	---	108
		9047	−56.0	+ 2.0	216	---
		9043	+64.0	−17.5	154	---
		9041	+77.0	−12.0	---	123
8	11 58	9049	−66.5	+11.0	---	108
		9050	−59.0	− 4.5	---	62
		9048	−58.5	−14.0	---	62
			−51.5	−15.0	123	---
		9047	−42.0	+ 2.0	216	---
			−24.0	−22.5	---	31
		9043	+78.5	−18.0	123	---
10	12 0	9049	−47.5	+11.5	---	46
			−40.0	+10.5	---	62
		9050	−33.5	− 4.5	---	93
		9048	−27.0	−15.0	---	170
		9047	−16.0	+ 2.0	216	---
		9052	+12.0	+ 9.0	---	31
		9051	+43.5	−10.0	---	62
			+48.0	− 9.5	108	---
11	12 0	9049	−29.0	+10.5	---	108
		9050	−22.0	− 5.0	77	---
			−17.5	− 4.0	---	31
		9048	−14.0	−16.0	---	185
		9047	− 2.0	+ 1.5	216	---
		9052	+26.0	+ 8.5	---	77
		9051	+57.0	−10.0	---	62
			+62.5	−10.0	123	---
13	11 55	9049	− 7.5	+11.0	---	46
			+ 0.5	+10.5	31	---
		9050	+ 5.5	− 5.5	---	46
		9048	+13.0	−16.0	---	247
		9047	+24.0	+ 1.5	216	---
		9052	+52.5	+ 8.0	---	170

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1919	h m		°	°		
Oct. 16	11 55	9055	−37.5	−17.5	62	---
			−32.0	−16.5	---	31
		9049	+41.0	+10.5	15	---
		9048	+52.0	−17.0	---	93
			+57.0	−15.0	---	123
		9047	+64.5	+ 1.0	247	---
18	11 59	9055	−12.0	−17.5	---	62
			− 1.0	−17.0	62	---
		9049	+69.0	+10.5	15	---
			+77.0	− 4.0	31	---
20	11 58	9056	−74.5	−10.5	154	---
		9055	+26.0	−17.5	---	46
27	12 7	9063	−77.0	+12.0	---	77
		9061	−66.0	+11.0	247	---
			−63.5	+14.0	---	31
		9062	−52.5	−21.0	---	31
		9059	−34.0	−14.5	123	---
		9060	+17.5	+11.0	---	15
			+22.0	+13.0	9	---
		9056	+19.0	−11.0	77	---
28	11 51	9063	−63.5	+12.0	---	62
		9061	−54.0	+12.5	---	340
		9062	−38.0	−20.5	---	46
		9059	−21.0	−15.0	108	---
		9060	+29.0	+11.5	---	46
		9056	+31.0	−11.0	---	62
Nov. 3	12 2	9065	−59.0	+ 3.0	154	---
		9064	−22.5	−16.0	---	247
		9061	+22.0	+14.5	---	123
			+24.0	+11.0	201	---
			+32.0	+12.5	---	185
		9062	+45.0	−22.0	62	---
		9059	+59.0	−16.0	154	---
6	11 50	9065	−19.5	+ 3.5	154	---
		9064	+17.5	−16.0	---	201
		9061	+63.0	+12.0	---	247
			+76.0	+11.0	---	247
		9062	+85.0	−21.0	154	---
10	11 52	9066	−25.0	+10.0	31	---
			−18.0	+11.0	19	---
		9067	+ 5.5	+ 4.5	123	---
			+11.0	+ 4.0	93	---
		9065	+34.0	+ 3.5	154	---
		9064	+73.0	−16.0	278	---
13	11 54	9068	−60.5	+ 4.5	15	---
		9067	+45.0	+ 5.0	31	---
			+51.0	+ 4.0	62	---
		9065	+74.0	+ 3.5	185	---
		884g	+87.5	+ 9.5	---	309
14	11 53	9068	−49.0	+ 4.0	---	31
			−41.0	+ 2.5	15	---
		9067	+63.5	+ 4.5	31	---
15	11 57	9068	−33.5	+ 4.0	---	77
		9067	+78.5	+ 5.0	62	---
17	11 57	9068	− 6.0	+ 4.0	---	62

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1919	h m		°	°		
Nov. 18	11 51	9069	−56.0	−18.0	---	77
19	11 59	9069	−42.0	−18.0	---	62
20	11 55	9069	−25.5	−18.5	---	46
		9070	−17.5	+11.5	---	31
21	11 50	9071	−85.0	+12.0	309	---
		9070	− 4.0	+12.0	---	62
24	11 57	9073	−58.0	+16.0	---	46
		9071	−48.0	+12.5	---	278
		9072	+39.0	−22.0	---	93
		9070	+41.0	+16.5	---	62
Dec. 1	11 54	9078	−56.0	−18.0	---	154
		9077	−47.5	+ 2.0	62	---
		9075	−12.5	−15.0	123	---
		9076	+22.0	+13.0	---	93
		9071	+47.0	+13.0	---	370
	11 54	9079	−37.5	− 9.0	---	77
		9078	−29.0	−18.0	---	154
		9077	−20.5	+ 2.5	31	---
		9075	+13.0	−15.0	93	---
			+34.0	+ 7.0	---	15
			+52.0	+12.5	---	62
		9076	+57.0	+12.0	93	---
			+64.0	+17.0	15	---
		9071	+73.0	+13.5	---	278
4	12 1	9079	−22.5	− 8.0	---	31
		9078	−16.0	−18.5	---	123
		9077	− 8.0	+ 2.0	---	31
		9075	+27.5	−15.0	62	---
			+61.0	+17.0	---	123
		9076	+64.5	+13.0	93	---
			+70.5	+12.0	93	---
10	11 52	9083	−58.5	+ 4.0	---	309
		9082	−52.0	+ 5.5	---	93
		9081	−35.0	+ 8.0	---	93
			+12.5	−10.5	---	31
		9080	+49.0	−11.5	---	46
		9078	+63.0	−18.5	---	93
11	11 49	9082–83	−41.0	+ 4.0	---	185
			−22.0	+16.0	31	---
13	12 0	9086	−64.0	−19.0	---	62
		9083	−18.0	+ 4.5	---	185
		9082	−11.0	+ 4.5	---	93
		9084	+48.0	−12.0	---	93
15	12 9	9087	−42.5	+15.0	---	62
		9083	+ 9.5	+ 4.5	---	185
		9082	+17.5	+ 5.0	---	93
17	11 57	9087	−17.5	+16.5	19	---
		9086	− 7.5	−19.0	15	---
		9083	+33.5	+ 4.5	---	93
		9082	+42.0	+ 5.5	---	62
20	11 52	9086	+30.0	−19.0	---	19
1919	h m		°	°		
Dec. 22	11 52	9092	−57.0	−17.5	31	---
		9090	−43.0	−12.0	25	---
		9089	+13.0	+ 4.5	---	62
			+25.5	+ 7.5	31	---
		9091	+53.0	−13.5	---	62
23	11 52	9090	−34.0	−12.5	25	---
		9088	−18.5	+14.0	---	93
		9089	+28.0	+ 5.0	31	---
		9091	+66.5	−13.0	---	123
29	11 54	9095	−49.5	− 9.0	15	---
			− 9.0	+11.0	9	---
		9092	+39.0	−15.0	---	62
30	11 52	9095	−34.0	− 7.5	---	93
		9092	+52.0	−14.0	---	93
31	11 31		−35.5	−12.5	9	---
		9095	−19.5	− 7.5	---	185
		9092	+65.0	−14.0	---	93
1920 Jan. 2	11 54	9095	+ 9.5	− 6.0	---	648
			+17.0	− 6.5	---	154
3	12 1	9095	+22.0	− 5.0	---	93
			+27.5	− 5.0	---	556
			+42.0	− 8.0	---	93
5	12 3	9095	+51.0	− 7.5	---	54
			+57.0	− 7.5	---	432
10	12 0	9101	−66.5	−15.0	---	62
		9100	−59.5	+12.5	15	---
		9099	−53.0	−14.5	123	---
		9098	−51.0	+11.0	62	---
		9097	−43.5	+13.5	93	---
			+11.0	+ 7.0	---	31
12	11 55	9102	−63.0	+ 2.5	---	370
		9101	−35.0	−13.5	15	---
		9099	−27.5	−14.5	108	---
		9098	−24.5	+11.5	77	---
		9097	−17.5	+14.5	93	---
14	12 1	9102	−37.0	+ 2.5	---	231
		9104	−13.5	−17.5	---	46
		9099	− 1.5	−15.0	154	---
		9098	+ 1.0	+11.0	---	93
		9097	+ 9.0	+14.0	62	---
15	12 13	9102	−22.0	+ 2.0	---	185
		9099	+11.0	−15.0	---	154
		9098	+15.0	+11.0	---	77
		9097	+22.0	+13.5	31	---
17	12 2	9102	+ 6.0	+ 2.0	123	---
		9099	+38.0	−16.0	139	---
		9098	+42.0	+11.5	31	---
			− 2.5	−10.0	---	93
			+ 2.0	−12.0	---	62
28	11 57	9108	+ 7.0	− 7.5	---	617
			+14.5	− 5.0	---	340
		9112	+17.5	− 3.0	---	154

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1920	h m		°	°		
Jan. 28	11 57	9105	+62.5	−19.5	---	185
			+75.0	−19.0	247	---
29	11 58	9108	+11.0	−10.0	---	93
			+17.5	−12.5	---	62
			+21.0	− 7.5	---	370
			+22.0	− 2.0	---	62
			+28.0	− 7.0	309	---
		9112	+32.0	− 3.5	---	62
		9105	+76.0	−20.0	123	---
30	11 52	9108	+24.0	−11.0	---	139
			+29.0	−12.0	---	46
			+34.0	− 7.5	---	340
			+42.0	− 6.0	309	---
		9112	+47.0	− 3.0	---	93
31	11 53	9108	+38.0	−11.0	---	62
			+44.5	−12.5	15	---
			+46.5	− 7.5	---	216
			+55.0	− 6.0	---	309
		9112	+64.0	− 3.0	62	---
Feb. 9	11 56	9118	−80.0	+ 6.5	---	556
		9117	−22.0	+12.0	---	31
			−17.5	+11.5	---	15
		9115	+29.0	−17.5	---	108
10	11 56	9118	−66.0	+ 6.5	---	340
		9117	+ 0.5	+11.5	---	46
		9115	+43.0	−16.5	---	46
14	11 58	9125	−74.0	+ 6.0	62	---
		9122	−64.0	−17.5	---	216
		9124	−57.0	+20.5	---	154
		9121	−50.5	− 8.5	62	---
		9120	−28.0	−21.5	6	---
			−21.0	−20.5	15	---
		9118	−17.0	+ 6.0	---	46
			− 8.5	+ 4.0	---	93
		9119	+11.0	+ 4.5	---	247
			+18.0	+ 4.0	31	---
16	11 59	9125	−47.0	+ 6.0	123	---
		9122	−37.0	−17.5	---	154
		9124	−27.5	+20.0	---	108
		9121	−23.0	− 8.0	77	---
		9118	+13.5	+ 5.0	15	---
			+19.0	+ 5.0	---	77
		9119	+38.0	+ 4.5	---	247
			+46.5	+ 3.5	31	---
17	12 7	9127	−77.5	− 6.5	77	---
		9125	−32.5	+ 6.0	77	---
		9122	−24.0	−17.5	---	123
		9124	−11.5	+19.5	---	62
		9121	− 9.0	− 8.0	93	---
		9118	+32.5	+ 5.5	62	---
		9119	+53.5	+ 4.5	---	216
18	11 59	9127	−64.0	− 7.0	62	---
		9128	−52.5	+17.5	---	77
		9126	−19.5	−20.0	---	31
		9125	−19.5	+ 6.0	62	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1920	h m		°	°		
Feb. 18	11 59	9122	−10.5	−19.0	---	46
		9124	+ 1.5	+19.5	---	31
		9121	+ 4.5	− 7.5	46	---
		9118	+47.0	+ 5.0	31	---
		9119	+62.0	+ 5.0	139	---
19	11 57	9127	−50.5	− 7.0	108	---
		9128	−37.5	+17.5	---	123
		9126	− 7.5	−20.0	---	31
		9125	− 6.5	+ 6.0	46	---
		9122	+ 3.0	−17.5	---	46
		9124	+15.5	+20.0	31	---
		9121	+18.0	− 7.5	46	---
		9118	+60.5	+ 5.0	62	---
		9119	+76.0	+ 5.0	---	185
20	12 17	9127	−38.0	− 6.5	---	62
		9128	−24.0	+17.5	---	170
		9125	+ 8.0	+ 7.0	---	77
		9126	− 8.0	−20.0	---	31
		9122	+17.0	−18.0	---	31
		9124	+30.0	+20.0	31	---
		9121	+31.5	− 7.5	15	---
25	11 57	9133	−43.0	− 9.5	---	185
		9130	−25.5	−14.5	---	62
		9128	+42.0	+18.0	154	---
26	11 56	9133	−29.0	− 9.0	---	247
		9128	+57.0	+18.0	93	---
27	12 2	9133	−19.0	− 9.5	139	---
			−13.5	− 9.0	---	108
		9128	+70.0	+17.5	154	---
Mar. 1	11 56	9133	+20.0	−10.0	123	---
			+27.5	− 9.0	---	93
2	11 57	9133	+32.5	− 9.5	139	---
			+39.5	− 9.0	---	108
3	11 59		−47.5	+19.0	31	---
		9133	+45.5	−10.0	123	---
			+54.0	− 9.5	---	123
6	11 55	9137	−28.0	+11.0	---	154
		9136	−13.0	+17.5	---	62
8	11 55	9139	−58.5	+ 7.0	154	---
		9140	− 8.5	+ 8.0	---	62
		9137	− 3.5	+11.0	---	216
		9136	+14.5	+17.0	---	123
9	11 54	9139	−45.0	+ 7.0	---	77
		9141	−13.0	−14.5	---	93
		9140	+ 4.5	+ 7.5	---	93
		9137	+12.0	+11.0	---	340
		9136	+27.5	+17.5	---	93
			+31.5	+15.0	---	31
10	11 59	9139	−33.5	+ 7.5	---	154
		9141	0.0	−15.0	---	154
		9140	+18.0	+ 7.5	---	154
		9137	+25.0	+11.0	---	463

1757—29——31

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1920	h m		°	°		
Mar. 10	11 59	9136	+39. 5	+17. 5	---	93
			+44. 5	+15. 0	---	62
15	11 53	9143	−81. 0	− 4. 0	---	679
		9142	−66. 5	−12. 0	---	123
		9141	+73. 5	−15. 0	93	---
17	11 57	9144	−70. 0	− 5. 0	340	---
		9143	−62. 0	− 4. 5	---	525
			−53. 0	− 5. 5	---	432
			−49. 0	− 4. 0	---	123
		9145	−50. 5	−11. 0	31	---
		9142	−39. 0	−12. 0	---	123
18	12 8	9144	−57. 5	− 5. 0	247	---
		9143	−43. 0	− 4. 0	---	741
			−34. 0	− 3. 5	---	154
		9145	−39. 0	−10. 5	---	93
		9142	−27. 0	−12. 0	---	123
22	12 1	9144	− 2. 5	− 5. 0	247	---
		9143	+14. 0	− 4. 5	---	710
			+24. 0	− 5. 0	---	617
		9145	+17. 5	−10. 0	---	123
		9142	+28. 0	−12. 0	46	---
		9146	+44. 5	−17. 0	15	---
23	12 0	9144	+11. 0	− 5. 0	216	---
		9143	+26. 5	− 4. 5	---	802
			+37. 5	− 5. 5	---	556
		9145	+30. 5	−10. 0	---	123
		9142	+41. 5	−12. 0	---	31
		9146	+57. 5	−17. 0	6	---
24	12 1	9151	−75. 0	− 5. 5	15	---
		9150	−70. 5	+ 9. 5	247	---
		9144	+24. 0	− 5. 5	216	---
		9143	+40. 0	− 5. 0	---	648
			+51. 0	− 5. 0	617	---
		9145	+43. 0	−10. 0	---	93
25	11 59	9151	−62. 0	− 6. 5	---	31
		9150	−57. 5	+ 9. 5	123	---
		9144	+37. 5	− 5. 0	139	---
		9143	+47. 0	− 6. 0	---	93
			+52. 0	− 4. 0	---	401
			+59. 0	− 3. 0	---	278
			+64. 0	− 4. 5	494	---
		9145	+58. 0	− 9. 0	---	154
27	11 53	9150	−30. 0	+ 9. 5	---	154
		9144	+63. 5	− 5. 0	185	---
		9143	+78. 5	− 3. 5	---	278
30	11 49	9152	−60. 5	+ 9. 5	15	---
		9150	+10. 0	+ 9. 0	123	---
			+60. 0	−17. 0	15	---
31	11 52	9153	−75. 0	−13. 5	31	---
		9152	−47. 5	+ 9. 0	15	---
		9150	+23. 0	+ 9. 0	123	---
Apr. 3	12 2	9150	+63. 0	+ 8. 5	---	154
6[2]	11 55	----	----	----	---	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1920	h m		°	°		
Apr. 7	11 57	9156	−53. 5	+ 0. 5	15	---
		9155	−27. 0	+ 4. 5	---	46
		9154	+35. 0	+10. 5	---	15
8[2]	11 54	----	----	----	---	---
9[2]	12 7	----	----	----	---	---
10	11 55	9157	−83. 0	− 7. 0	494	---
13	11 51	9158	−69. 0	− 5. 0	62	---
		9157	−42. 0	− 7. 0	401	---
14	11 52	9158	−56. 5	− 5. 0	46	---
		9157	−28. 0	− 7. 0	340	---
15	11 52	9158	−42. 0	− 5. 0	46	---
		9157	−17. 0	− 6. 5	370	---
19	11 52	9157	+37. 5	− 5. 5	247	---
21	11 51	9159	+40. 0	− 6. 0	---	15
		9157	+62. 5	− 5. 0	278	---
22	11 57	9159	+52. 0	− 5. 0	---	31
		9157	+77. 0	− 5. 5	216	---
23	11 53	9159	+63. 0	− 5. 0	15	---
24	11 57		+ 9. 0	+23. 0	9	---
28	11 53	9161	−37. 0	+10. 5	77	---
		9162	−19. 0	+15. 0	---	46
29	11 57	9161	−23. 0	+10. 5	62	---
		9162	− 9. 0	+15. 0	31	---
			− 4. 5	+15. 5	---	31
May 1	11 57	9166	−25. 0	−15. 5	---	31
		9161	+ 3. 5	+10. 5	77	---
		9163	+59. 0	+ 4. 0	15	---
3	12 1	9172	−85. 0	−11. 0	154	---
		9170	−78. 0	− 8. 5	123	---
		9168	−60. 0	− 5. 0	6	---
		9161	+30. 0	+10. 5	62	---
4	11 55	9172	−71. 0	−11. 0	---	93
		9170	−65. 0	− 7. 5	123	---
		9171	−46. 0	− 5. 0	31	---
		9161	+43. 5	+11. 0	62	---
5	11 58	9172	−58. 0	−11. 0	---	62
		9170	−50. 5	− 7. 5	123	---
		9171	−31. 0	− 5. 0	22	---
		9161	+57. 0	+10. 5	62	---
6	11 55	9172	−45. 0	−11. 0	31	---
		9170	−36. 0	− 7. 5	93	---
		9171	−17. 5	− 5. 0	15	---
		891d	+40. 0	+16. 0	---	15
		9161	+70. 0	+10. 5	77	---
10	11 52	9176	−60. 5	+19. 5	---	62
		9174	−42. 0	− 4. 5	31	---

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1920	h m		°	°		
May 10	11 52	891f	+7.5	−7.5	---	15
		9170	+18.0	−7.0	---	123
		9173	+27.5	−3.0	---	46
11	11 52	9177	−57.0	+21.0	---	46
		9176	−47.5	+19.5	---	77
		9174	−29.0	−4.0	---	31
		9170	+31.0	−7.0	---	93
		9173	+40.0	−3.0	---	15
15	11 56	9176	+7.5	+18.0	---	15
		9178	+85.0	+17.5	247	---
17	11 55	9181	−69.0	+22.0	62	---
22	12 3	9182	−69.0	+9.5	---	185
		9181	−2.0	+22.5	15	---
27	11 54	9186	−63.0	+13.5	---	93
			−16.5	−13.0	---	9
		9184	−11.0	+11.0	---	31
		9183	−6.0	−10.0	---	31
		9182	−4.0	+8.0	---	154
			+54.0	+17.0	---	31
28	11 50	9186	−48.0	+13.5	---	77
		9184	+2.0	+11.5	---	31
		9182	+10.5	+8.0	---	185
		9188	+38.5	−11.0	---	31
29	11 58	9186	−36.0	+13.5	---	108
		9182	+24.0	+8.0	---	185
		9188	+53.0	−11.0	---	62
June 1	11 53	9191	−70.0	−5.0	---	46
		9189	−53.0	+13.5	---	93
			−46.0	+14.5	---	154
		9186	+9.0	+13.5	15	---
		9190	+16.0	+17.0	---	31
		9182	+63.5	+8.0	154	---
		9187	+83.0	+7.0	154	---
2	11 55	9191	−56.0	−5.5	---	31
		9189	−39.5	+13.0	---	62
			−32.0	+14.5	247	---
			−30.5	+10.5	31	---
		9186	+21.0	+13.0	---	31
		9190	+29.0	+17.0	---	62
		9182	+77.0	+8.0	123	---
3	11 56	9191	−41.5	−5.0	---	31
		9189	−25.0	+13.0	31	---
			−18.0	+14.0	247	---
		9190	+44.0	+15.5	---	31
7	11 58	9193	−59.0	+13.5	---	46
		9189	+37.5	+12.5	278	---
8	11 50	9194	−46.0	+22.0	15	---
		9193	−44.5	+13.5	---	154
		9189	+50.0	+12.0	278	---
9	12 0	9195	−70.0	+9.5	---	31
		9194	−33.5	+21.0	9	---
		9193	−32.0	+13.0	---	216
		9189	+63.0	+12.0	309	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1920	h m		°	°		
June 10	11 53	9195	−58.5	+10.0	---	31
		9196	−30.5	+18.5	---	31
		9193	−18.0	+13.5	---	201
		9189	+77.0	+12.5	247	---
11	12 1	9196	−14.5	+18.0	---	31
		9193	−2.5	+13.0	---	123
14	12 5	9196	+25.0	+18.0	---	77
		9193	+35.0	+15.0	---	154
16	11 54	9198	−58.0	−10.0	108	---
		9196	+50.0	+18.0	---	62
		9193	+62.0	+15.0	154	---
18	11 53	9199	−62.0	−8.5	---	154
		9198	−31.0	−10.0	46	---
24	11 52	9201	−39.0	+13.5	---	139
		9203	+4.0	−20.5	---	77
		9199	+19.5	−9.0	---	31
		9198	+50.5	−10.0	---	31
25	11 51	9204	−83.0	+12.5	401	---
		9201	−26.5	+13.0	---	154
		9203	+17.5	−20.5	---	93
		9199	+32.5	−9.0	15	---
26	11 59	9204	−68.0	+12.5	247	---
		9201	−12.0	+13.5	---	123
		9203	+27.5	−20.5	31	---
			+37.0	−21.0	62	---
		9199	+47.0	−9.0	25	---
29	11 56	9207	−57.5	−16.0	---	247
		9204	−29.0	+13.0	216	---
		9201	+28.5	+14.5	---	93
July 1	12 0	9207	−30.5	−17.0	---	278
		9204	−2.0	+13.0	154	---
		9201	+58.0	+12.5	---	62
3	11 53	9207	−4.5	−16.5	---	309
		9204	+23.5	+13.0	216	---
5	11 56	9208	−58.0	+15.0	---	93
		9207	+22.0	−16.0	---	340
		9204	+50.0	+13.0	216	---
7	11 56	9208	−31.0	+17.5	---	62
			+32.5	−11.0	---	15
		9207	+50.5	−15.5	247	---
		9204	+77.5	+13.5	185	---
8	11 55	9209	−72.0	−4.5	46	---
		9208	−18.0	+17.0	---	31
			+49.0	−11.0	31	---
		9207	+63.5	−15.5	216	---
9	11 59	9209	−66.0	−3.5	15	---
			−58.5	−4.5	31	---
		9208	−3.5	+17.0	---	46
		9207	+78.0	−15.5	185	---
10	11 58	9209	−45.5	−4.5	31	---
		9208	+10.5	+17.0	---	46

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1920	h m		°	°		
July 12	11 45	9209	−18. 5	− 5. 0	31	---
		9208	+38. 0	+17. 5	---	93
13	11 46	9208	+53. 0	+17. 0	---	62
14	11 52	9208	+69. 5	+17. 0	31	---
16	11 47	9212	−60. 0	−14. 0	31	---
17	11 48	9213	−72. 5	+10. 5	123	---
			−71. 0	+ 7. 0	31	---
		9212	−47. 5	−14. 0	15	---
19	11 46	9213	−48. 0	+11. 0	77	---
20	11 49	9213	−34. 5	+11. 0	77	---
21	11 48	9213	−21. 5	+11. 0	77	---
22	11 46	9215	−83. 0	+12. 0	123	---
		9213	− 9. 0	+11. 0	77	---
23	11 55	9215	−68. 5	+12. 0	77	---
		9213	+ 4. 5	+11. 0	93	---
24	11 49	9215	−56. 0	+12. 0	62	---
		9213	+19. 0	+11. 0	93	---
26	11 50	9216	−58. 5	−15. 5	123	---
		9215	−30. 0	+12. 0	108	---
		9213	+44. 5	+10. 5	77	---
27	11 54	9217	−75. 0	− 9. 0	46	---
		9216	−45. 0	−15. 0	108	---
		9215	−17. 0	+12. 0	93	---
		9213	+58. 0	+10. 0	62	---
28	11 57	9217	−58. 5	− 8. 5	---	62
		9216	−32. 0	−15. 0	108	---
		9215	− 3. 0	+12. 0	93	---
		9213	+71. 5	+10. 0	123	---
29	11 51	9217	−41. 5	− 5. 5	---	15
		9216	−18. 0	−14. 0	93	---
		9215	+10. 0	+12. 0	62	---
		9213	+85. 0	+12. 0	---	309
30	11 45	9216	− 5. 0	−13. 5	77	---
		9215	+23. 0	+12. 5	62	---
31	11 46	9216	+ 8. 0	−14. 0	77	---
		9215	+37. 0	+12. 0	62	---
Aug. 2	11 46	9218	−46. 0	+12. 5	---	31
		9216	+33. 5	−14. 0	93	---
		9215	+64. 0	+13. 5	---	108
3	11 47	9218	−30. 0	+12. 0	15	---
		9216	+47. 5	−14. 0	93	---
		9215	+77. 5	+12. 5	---	62
4	11 45		− 8. 5	− 9. 5	---	31
		9220	+12. 0	+12. 5	6	---
			+15. 0	+10. 0	3	---
		9216	+61. 0	−14. 5	---	93
1920	h m		°	°		
Aug. 6	12 4	9220	+46. 0	+12. 5	15	---
13	11 55	9225	−74. 0	+11. 0	---	93
		9222	−68. 0	−21. 5	185	---
		9221	−28. 0	+12. 0	---	31
16	11 54	9225	−34. 5	+11. 5	---	31
		9222	−25. 0	−21. 5	---	62
			−18. 0	−21. 5	108	---
		9221	+14. 0	+11. 0	---	93
17	12 4	9225	−20. 5	+11. 0	15	---
		9222	−10. 0	−21. 0	---	46
			− 5. 0	−21. 5	108	---
		9221	+25. 0	+12. 0	6	---
			+31. 0	+10. 5	9	---
18	11 45	9225	− 7. 5	+11. 0	15	---
		9222	+ 2. 5	−21. 0	---	15
			+ 8. 0	−21. 5	93	---
25	11 46	9226	−29. 5	+11. 0	---	46
27	11 46	9226	− 2. 0	+10. 5	---	31
30	11 43	9227	−44. 5	−16. 5	---	185
31	11 47	9227	−32. 0	−16. 0	---	216
Sept. 1	12 0	9227	−17. 5	−15. 0	---	586
		9229	− 6. 5	−13. 5	---	15
3	11 50	9227	+11. 0	−15. 0	---	988
8	11 54	9231	−64. 0	−16. 0	---	46
		9227	+77. 0	−15. 0	---	802
13	11 54	9231	+ 0. 5	−15. 5	9	---
			+ 7. 0	−12. 0	46	---
			+12. 5	−12. 0	46	---
		9232	+37. 5	+ 7. 5	---	154
			+42. 0	+ 9. 5	---	123
14	12 19	9231	+20. 5	−12. 0	46	---
			+27. 0	−11. 5	31	---
		9232	+52. 0	+ 8. 0	---	231
			+56. 5	+11. 0	---	201
15	11 58	9231	+36. 5	−12. 0	---	46
		9232	+67. 5	+ 8. 0	---	556
17 [2]	11 54	----	----	----	---	---
18 [2]	11 54	----	----	----	---	---
20 [2]	11 57	----	----	----	---	---
21	11 57	9233	−77. 0	−11. 0	93	---
22	11 50	9235	−78. 0	−12. 0	---	432
		9233	−62. 0	−11. 0	93	---
24	11 52	9236	−68. 0	−15. 0	108	---
			−61. 5	−17. 5	62	---

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1920	h m		°	°		
Sept. 24	11 52	9235	−58. 0	− 9. 5	---	93
			−52. 0	−12. 0	---	432
		9233	−37. 5	−11. 0	---	62
25	11 48	9236	−56. 5	−15. 0	93	---
			−46. 0	−17. 0	---	77
		9235	−45. 0	− 8. 5	---	62
			−38. 0	−12. 0	---	432
		9233	−22. 5	−10. 5	108	---
28	11 46	9239	−18. 0	+14. 0	---	123
		9236	−18. 0	−13. 5	---	123
		9235	+ 1. 0	−12. 0	---	309
		9233	+17. 5	−10. 5	---	31
		9237	+56. 0	+13. 5	---	185
29	11 59	9239	− 5. 0	+13. 5	---	216
		9236	− 3. 0	−15. 0	62	---
		9235	+14. 5	−12. 0	---	247
		9233	+30. 0	−10. 0	---	15
		9237	+69. 0	+13. 5	---	216
Oct. 1	11 59	9241	−72. 5	+ 7. 5	---	123
		9236	+23. 0	−15. 0	93	---
		9239	+27. 5	+13. 0	123	---
		9235	+43. 0	−12. 0	---	185
2	11 55	9241	−60. 5	+ 7. 5	---	93
		9236	+37. 0	−13. 0	---	93
		9239	+40. 5	+13. 0	---	108
		9235	+54. 5	−12. 5	---	123
			+60. 0	−10. 5	---	93
4	11 50	9243	−71. 0	+ 9. 5	---	216
		9241	−36. 0	+ 8. 0	---	93
		9242	+17. 0	− 7. 0	---	31
		9236	+62. 5	−15. 5	---	62
		9239	+67. 5	+12. 5	123	---
		9235	+80. 0	−12. 5	154	---
5	11 50	9243	−57. 5	+ 9. 5	---	247
		9241	−19. 0	+ 7. 5	---	46
		9242	+32. 0	− 7. 0	---	31
		9236	+79. 0	−16. 0	62	---
		9239	+80. 5	+12. 0	93	---
6	12 4	9246	−85. 0	−16. 0	---	370
		9243	−44. 5	+10. 0	---	247
		9241	− 5. 0	+ 7. 5	---	46
7	11 55	9246	−76. 0	−17. 0	---	216
		9245	−67. 0	−17. 0	---	463
		9243	−31. 0	+10. 0	---	278
		9241	+ 9. 5	+ 7. 0	31	---
8	11 46	9246	−64. 0	−17. 0	---	154
		9245	−55. 0	−17. 0	---	401
		9243	−17. 5	+ 9. 5	---	278
		9241	+22. 5	+ 7. 0	31	---
9	11 55	9246	−51. 0	−17. 0	---	93
		9245	−42. 0	−17. 5	216	---
			−37. 5	−14. 5	---	46
		9243	− 4. 0	+ 9. 0	---	216
		9244	+ 0. 5	+11. 0	---	15
		9241	+38. 0	+ 7. 5	---	31

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1920	h m		°	°		
Oct. 11	11 51	9246	−25. 0	−18. 5	---	31
		9245	−17. 0	−18. 0	---	216
			−10. 5	−14. 5	---	31
		9247	−12. 0	+ 9. 0	---	170
		9243	+22. 5	+ 8. 0	---	154
		9244	+24. 0	+12. 0	---	31
		9241	+56. 5	+10. 5	---	9
			+65. 0	+11. 0	---	15
12	11 51	9245	− 2. 5	−18. 0	---	185
			+ 3. 5	−15. 0	---	15
		9247	+ 3. 5	+ 9. 0	---	154
		9243	+36. 0	+ 8. 0	---	108
		9244	+40. 0	+11. 0	---	62
13	11 50	9245	+10. 0	−18. 0	---	154
		9247	+17. 0	+ 8. 5	---	123
		9243	+49. 0	+ 8. 0	---	123
		9244	+53. 5	+11. 5	---	31
14	11 50	9248	−26. 0	− 8. 5	---	46
		9245	+22. 5	−18. 0	---	93
		9247	+33. 0	+ 8. 5	---	108
		9243	+64. 5	+ 7. 5	---	93
15	11 54	9249	−76. 0	+12. 5	62	---
		9248	−13. 0	− 8. 5	---	154
		9245	+36. 0	−18. 0	---	62
		9247	+46. 5	+ 9. 0	---	139
		9243	+77. 5	+ 7. 5	93	---
16	11 49	9249	−62. 0	+13. 0	62	---
		9248	+ 1. 0	− 8. 5	---	154
		9245	+48. 0	−17. 5	---	62
		9247	+61. 0	+ 8. 5	---	154
19	11 53	9251	−65. 0	+19. 0	---	123
		9249	−23. 5	+10. 0	---	62
		9250	+38. 0	− 9. 0	---	93
		9248	+46. 0	− 8. 5	---	31
20	11 51	9251	−53. 0	+19. 5	---	154
		9249	−10. 5	+ 9. 5	---	31
		9248	+59. 0	− 8. 5	---	108
			+67. 0	−11. 0	15	---
21	11 50	9253	−73. 0	−14. 5	---	123
		9252	−68. 0	−17. 5	---	15
			−64. 0	+18. 0	15	---
		9251	−39. 0	+19. 5	---	154
		9250	+61. 0	−10. 0	---	77
		9248	+72. 5	− 8. 5	---	123
22	11 49	9253	−60. 0	−15. 0	---	154
		9254	−32. 0	−15. 0	---	31
		9251	−29. 5	+20. 0	---	93
			−20. 0	+18. 0	---	46
		9249	+17. 0	+ 9. 0	---	15
		9250	+74. 0	−11. 0	62	---
23	11 49	9253	−47. 0	−14. 0	---	216
			−38. 0	−12. 5	---	46
		9254	−18. 0	−16. 5	---	93
		9251	−16. 0	+19. 5	---	46
			− 7. 0	+17. 5	---	62

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1920	h m		°	°		
Oct. 25	11 53	9253	−20.5	−13.5	---	93
			−12.0	−12.5	---	62
		9254	+7.0	−15.0	---	62
		9251	+18.0	+17.5	---	108
26	11 56	9253	−7.5	−13.5	---	93
		9255	+8.0	−16.0	---	46
			+18.5	−17.0	---	31
		9254	+23.5	−13.0	---	15
		9251	+34.0	+16.5	---	123
			+67.0	+16.0	15	---
29	11 47	9255	+46.5	−15.0	---	46
			+53.5	−19.5	93	---
		9251	+72.0	+16.0	---	123
30	11 59	9257	−74.0	+10.0	---	93
		9255	+69.0	−20.0	77	---
Nov. 1	11 49	9258	−57.0	−12.0	---	741
		9257	−46.0	+10.5	---	77
3	11 53	9258	−30.0	−12.0	---	679
		9257	−15.0	+10.0	31	---
			+60.5	+17.0	---	31
4	11 46	9258	−21.0	−12.5	---	309
			−15.5	−12.0	---	62
			−10.5	−10.5	401	---
		9257	−0.5	+10.0	31	---
5	11 58	9258	−7.5	−12.5	---	216
			+3.5	−10.0	---	463
		9257	+13.5	+10.0	31	---
6	11 51	9261	+7.0	+12.5	---	62
		9258	+7.0	−12.5	---	216
			+17.5	−9.0	---	463
		9257	+27.0	+9.5	31	---
8	11 50	9261	+33.0	+13.5	---	62
		9258	+34.5	−12.0	---	93
			+45.0	−8.5	401	---
12	11 59	9262	+44.0	+2.0	31	---
13	11 50	9262	+56.0	+2.0	---	93
18	11 53	9263	−28.0	+18.5	123	---
19	11 48	9263	−14.5	+18.5	108	---
23	11 50	9267	−79.0	−13.0	123	---
		9266	−64.5	−12.0	---	216
		9263	+37.5	+19.0	93	---
26	11 52	9270	−76.0	−9.5	278	---
		9267	−39.0	−14.0	---	93
		9266	−28.0	−13.5	---	62
			−20.0	−11.0	---	93
		9263	+77.5	+19.0	108	---
Dec. 2	11 49	9270	+4.5	−9.5	---	201
		9272	+38.0	−10.5	---	31
3	11 55	9270	+18.5	−9.5	216	---
		9271	+54.5	−10.5	---	31

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1920	h m		°	°		
Dec. 7	11 51	9273	−81.0	−11.0	---	370
		9270	+72.5	−9.5	185	---
14	11 51	9274	−55.0	−8.0	---	46
		9273	+14.0	−10.5	---	12
15	11 58	9274	−42.5	−8.0	---	31
		9273	+28.0	−10.5	---	15
17	11 56	9275	−64.0	+17.0	77	---
			−57.5	+18.0	---	93
18	12 2	9277	−66.5	−7.5	---	46
		9275	−50.0	+17.0	93	---
			−42.5	+18.5	93	---
		9276	+2.5	+17.0	---	77
21	11 53	9278	−64.0	+10.0	216	---
		9275	−7.0	+17.5	---	93
		9276	+44.5	+14.0	---	247
23	11 53	9278	−39.0	+9.5	---	216
		9277	+3.0	−8.0	---	62
		9275	+17.5	+14.5	31	---
		9276	+77.0	+13.5	---	185
24	12 44	9279–80	−73.0	−12.0	---	154
		9278	−25.0	+9.5	216	---
		9277	+17.5	−8.0	---	108
		9275	+30.0	+14.5	---	31
31	11 50	9282	−74.0	−7.0	---	216
		9281	+1.5	+21.5	15	---
		9280	+11.0	−11.5	---	46
			+20.0	−11.0	---	123
		9278	+68.0	+7.5	---	154
1921						
Jan. 4	11 55	9282	−17.0	−7.0	---	309
		9280	+75.0	−13.0	62	---
5	11 57	9282	−4.0	−7.0	---	201
6	11 53	9282	+11.5	−7.0	---	216
13	11 57	9286	−55.0	+5.0	62	---
		9283	−18.0	−9.5	---	494
		9285	−4.0	+8.0	---	62
		9284	+50.5	−14.0	---	586
17	11 52	9286	−3.5	+4.5	216	---
		9283	+38.5	−11.5	---	139
18	11 51	9286	+10.5	+4.5	---	201
		9283	+51.5	−10.5	139	---
21	11 58	9288–89–90	−58.0	−10.0	---	185
		9287	+47.5	−7.5	---	62
		9286	+50.0	+3.5	170	---
22	11 59	9288–89–90	−45.0	−10.0	---	116
		9287	+48.0	−7.5	---	62
		9286	+62.5	+4.0	---	154
25	11 58	9291	−53.0	+12.5	15	---
		9288–89–90	−7.5	−11.5	---	31

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1921	h m		°	°		
Jan. 26	12 3		−70. 0	− 9. 0	23	---
		9289	+ 9. 0	−11. 5	31	---
27	11 54	9289	+22. 0	−11. 5	46	---
		9291	−28. 0	+13. 5	---	62
28	12 1	9293	−62. 5	−10. 0	46	---
		9289	+36. 0	−11. 5	---	46
		9292	+27. 0	−10. 0	31	---
Feb. 1	12 10	9294–95	−52. 0	−15. 0	---	247
		9296	−63. 5	+ 8. 5	31	---
2	11 56	9296–901c	−50. 5	+ 9. 0	---	62
		9294–95	−39. 0	−15. 0	---	247
3	11 56	9296	−36. 0	+ 8. 0	31	---
		9294–95	−25. 0	−15. 0	---	309
4	11 54	9294–95	−11. 5	−15. 0	---	247
12	12 0	9302	−63. 0	−11. 5	---	62
14	12 10	9303	−50. 5	− 9. 0	15	---
		9302	−31. 5	−11. 5	31	---
		9297	+50. 0	− 9. 5	---	23
15	11 59	9303	−37. 5	− 8. 0	8	---
		9302	−18. 5	−10. 0	15	---
16	11 58	901h	−60. 5	−14. 0	15	---
		9303	−23. 0	− 8. 5	8	---
		9302	− 5. 0	−10. 5	15	---
17	11 57	9303	−15. 0	− 7. 5	---	46
18	11 56	9303	+ 1. 5	− 7. 0	---	231
23	11 53	9304	+33. 5	− 9. 5	---	77
		9303	+72. 0	− 6. 5	---	494
28	11 55	9306	−60. 0	−14. 5	62	---
		9305	−53. 0	+12. 0	---	108
Mar. 1	11 54	9305	−42. 0	+11. 5	---	62
2	11 56	9305	−29. 5	+12. 0	---	39
5 [2]	12 1	----	----	----	---	---
8	12 4	9308	−69. 0	+ 6. 5	---	39
10	12 1	9310	−80. 0	− 7. 0	154	---
		9308	−43. 0	+ 6. 0	---	247
11	11 57	9310	−68. 0	− 6. 5	77	---
		9308	−28. 0	+ 6. 5	---	185
12	11 55	9311	−80. 0	−10. 5	139	---
		9310	−55. 0	− 7. 0	62	---
		9308	−15. 0	+ 6. 0	---	154
14	11 56	9311	−51. 5	−10. 5	123	---
		9310	−29. 5	− 7. 5	---	31
		9312	−21. 0	− 7. 0	---	23
		9308	+18. 0	+ 6. 0	108	---
1921	h m		°	°		
Mar. 15	12 3	9311	−39. 0	−11. 0	93	---
		9310	−14. 5	− 8. 0	31	---
		9308	+30. 0	+ 5. 0	46	---
16	11 58	9311	−25. 5	−10. 5	93	---
		9308	+43. 5	+ 5. 5	39	---
17	11 58	9311	−11. 0	−10. 5	62	---
		9310	+12. 0	− 7. 0	15	---
		9308	+57. 0	+ 5. 5	---	31
18	12 1	9311	+ 2. 5	−10. 5	46	---
		9313	+54. 0	+20. 0	---	108
21	12 5	9315	−77. 0	+10. 5	216	---
		9314	+63. 5	+14. 5	---	139
23	12 10	9315	−55. 0	+10. 0	---	525
25	11 57	9316	−66. 0	− 8. 5	---	170
		9315	−27. 5	+10. 5	---	432
26	11 54	9316	−52. 0	− 8. 5	---	231
			−21. 0	+10. 0	---	23
		9315	− 8. 5	+10. 5	---	401
29	11 48	9316	− 9. 5	− 8. 5	---	216
		9315	+31. 0	+10. 5	---	340
30	11 56	9316	+ 7. 5	− 8. 0	139	---
		9315	+45. 0	+10. 5	278	---
Apr. 1	12 1	9320	−51. 0	−15. 0	15	---
		9316	+34. 0	− 8. 5	154	---
		9315	+72. 0	+10. 5	309	---
2	11 58	9316	+47. 5	− 8. 5	123	---
4	11 57	9322	+20. 0	−10. 0	---	46
		9316	+73. 5	− 8. 5	---	185
5	11 53	9323	−74. 0	+18. 0	---	139
		9322	+35. 0	−10. 0	46	---
6	12 1	9323	−57. 5	+18. 0	---	216
		9322	+50. 0	−10. 0	100	---
11	11 53	9324	−62. 5	+10. 5	216	---
		9323	{+ 5. 5	+18. 5	---	93
			{+15. 0	+18. 5	69	---
12	11 56	9324	−49. 5	+10. 5	247	---
		9323	+23. 0	+18. 0	---	108
13	12 3	9324	−35. 5	+10. 5	---	278
		9323	+36. 0	+18. 5	---	77
14	12 4	9324	−22. 0	+10. 0	---	247
		9323	+55. 0	+19. 0	8	---
15	12 3	9324	− 9. 5	+10. 0	---	247
		9325	+38. 0	+14. 5	---	31
		9323	+68. 0	+19. 0	---	77
19	12 2	9330	−72. 5	− 6. 5	---	62
		9329	−49. 5	+10. 0	185	---

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1921	h m		°	°		
Apr. 19	12 2	9328	−33. 0	−15. 0	---	170
		9324	+45. 0	+10. 0	93	---
		9326	+66. 0	+11. 5	---	247
20	11 58	9330	−57. 0	− 6. 5	---	62
		9329	−35. 0	+10. 0	154	---
		9328	−19. 5	−15. 0	---	93
		9324	+58. 0	+10. 5	---	77
21	12 0	9330	−43. 0	− 6. 0	---	85
		9329	−20. 5	+10. 0	100	---
		9328	− 4. 0	−15. 5	93	---
		9324	+70. 0	+10. 0	46	---
25	12 0	9330	+12. 0	− 6. 5	---	23
		9329	+30. 5	+10. 0	108	---
		9328	+45. 5	−15. 0	---	85
26	12 6	9330	+24. 0	− 6. 0	---	15
		9329	+44. 5	+10. 0	123	---
		9328	+58. 0	−16. 0	---	154
28	11 57	9329	+74. 5	+10. 0	123	---
May 7[2]	11 55	----	----	----	---	---
9	11 58	9334	−67. 5	+ 0. 5	---	1296
10	11 54	9334	−54. 5	+ 0. 5	---	1358
14	11 55	9334	− 4. 0	0. 0	---	988
17	11 58	9334	+40. 5	+ 1. 5	---	833
18	12 15	9339	−80. 0	+12. 0	62	---
		9334	+55. 5	+ 1. 0	---	741
19	11 49	9339	−68. 5	+12. 0	---	123
		9334	+68. 0	+ 1. 5	---	741
20	11 47	9339	−55. 5	+11. 5	---	77
		9334	+80. 5	+ 1. 5	---	401
21	11 52	9339	−38. 5	+11. 0	100	---
23	12 4	9339	−12. 5	+12. 5	---	77
28	12 3	9342	−67. 0	− 6. 0	77	---
31[2]	11 54	----	----	----	---	---
June 1	11 54	9344	−37. 0	+14. 5	---	54
		9343	+69. 5	+12. 0	---	31
2	11 52	9344	−22. 5	+13. 5	---	77
3	11 48	9344	− 8. 0	+13. 5	---	108
6	11 50	9345	−43. 5	+ 0. 5	93	---
		9344	+32. 0	+12. 5	---	93
9	11 49	9346	− 7. 0	+ 6. 5	---	93
		9345	− 4. 0	0. 0	108	---
		9344	+69. 5	+12. 5	62	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1921	h m		°	°		
June 10	11 55	9346	+ 6. 5	+ 8. 5	---	216
		9345	+ 9. 5	+ 0. 5	116	---
11	11 56	9350	+11. 5	+16. 5	---	54
		9346	+20. 5	+ 8. 0	---	139
		9345	+22. 5	+ 0. 5	108	---
13	11 56	9352	− 1. 5	− 7. 0	---	23
		9346	+48. 5	+ 8. 5	---	69
		9345	+49. 5	+ 0. 5	77	---
14	12 0	9346	+64. 0	+ 8. 0	---	77
		9345	+64. 5	+ 0. 5	100	---
15	11 49	9345	+76. 5	+ 1. 0	77	---
16	12 29	9353	−82. 5	+10. 0	77	---
20	11 58	9353	−29. 5	+10. 0	139	---
21	11 56	9353	−15. 5	+10. 5	170	---
22	11 54	9353	− 2. 5	+11. 0	216	---
23	11 51	9353	+11. 5	+11. 5	170	---
24	11 54	9355	−78. 5	+12. 0	---	93
		9353	+25. 0	+11. 0	154	---
25	11 51	9355	−66. 0	+12. 5	100	---
		9356	−62. 0	−12. 5	---	139
		9354	−38. 5	+12. 0	15	---
		9353	+37. 5	+11. 0	139	---
27	11 31	9357	−51. 5	+13. 5	---	216
		9355	−40. 0	+14. 0	93	---
		9356	−34. 0	− 8. 5	---	370
		9353	+66. 0	+11. 0	139	---
28	11 49	9357	−38. 0	+12. 5	---	154
		9355	−27. 5	+13. 0	---	77
		9356	−20. 0	− 8. 5	---	617
		9353	+78. 0	+11. 0	123	---
29	11 55	9357	−24. 0	+12. 5	---	309
		9355	−14. 0	+13. 5	---	77
		9356	− 6. 0	− 8. 5	---	617
30	11 40	9359–60	−79. 5	+ 6. 5	---	370
		9358	−51. 5	−11. 0	---	93
		9357	−11. 5	+12. 0	---	309
		9355	− 0. 5	+13. 0	---	62
		9356	+ 7. 0	− 8. 0	---	617
July 2	12 5	9361	−68. 5	+12. 0	---	494
		9360	−55. 0	+ 5. 0	---	370
		9357	+16. 5	+13. 5	---	139
		9355	+26. 5	+14. 5	15	---
		9356	+35. 0	− 7. 5	---	432
4	11 45	9361	−42. 5	+12. 5	---	432
		9363	−37. 0	+ 7. 5	---	31
		9360	−28. 0	+ 3. 0	---	278
		9357	+42. 5	+14. 0	---	93
		9356	+60. 5	− 7. 5	---	309

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1921	h m		°	°		
July 5	11 46	9364	−35. 0	+10. 0	---	23
		9361	−29. 0	+12. 5	---	556
		9363	−23. 5	+ 7. 0	---	23
		9360	−15. 0	+ 2. 5	---	370
		9357	+56. 5	+14. 5	---	15
		9356	+74. 0	− 7. 5	---	509
7	11 43	9361	− 4. 5	+11. 5	---	370
		9360	+12. 0	+ 2. 5	---	262
8	11 44	9369	−46. 5	+ 2. 5	---	77
		9361	+10. 5	+12. 0	---	278
		9360	+25. 5	+ 2. 5	---	262
9	11 53	9369	−33. 0	+ 2. 5	---	131
		9368	+12. 0	−13. 0	---	69
		9361	+26. 0	+12. 5	---	170
		9360	+39. 5	+ 2. 5	---	170
12	11 56	9369	+ 5. 0	+ 1. 5	46	---
13	11 48	9371	−50. 0	− 5. 0	---	85
		9369	+19. 0	+ 1. 5	23	---
		9368	+67. 0	−13. 5	---	201
		9361	+79. 5	+11. 5	---	93
14	11 54	9371	−38. 0	− 5. 5	---	177
		9370	+85. 0	−12. 5	---	247
15	12 2	9371	−24. 5	− 6. 0	---	123
16	11 44	9371	−10. 0	− 5. 5	---	108
18	11 56	9371	+17. 0	− 5. 5	---	31
20 [2]	11 47	----	----	----	---	---
21	11 50	9373	−62. 5	− 5. 5	15	---
22	11 50	9373	−50. 5	− 6. 0	15	---
23	11 50	9373	−37. 5	− 6. 0	8	---
25	11 50	9376	−71. 0	−10. 5	---	154
		9375	−46. 0	+12. 0	---	15
26	11 52	9376	−58. 5	−10. 0	---	278
		9375	−31. 5	+12. 0	---	62
27	11 46	9376	−44. 5	−10. 5	---	401
		9375	−21. 0	+12. 0	---	8
28	11 49	9376	−30. 5	−10. 5	---	432
		9375	− 5. 0	+12. 0	---	69
30	11 45	9376	− 3. 0	− 9. 0	---	401
Aug. 1	11 47	9376	+25. 5	− 9. 5	---	309
4	11 48	9376	+68. 5	−10. 5	---	216
5 [2]	11 55	----	----	----	---	---
6 [2]	11 49	----	----	----	---	---
8 [2]	11 50	----	----	----	---	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1921	h m		°	°		
Aug. 9 [2]	11 48	----	----	----	---	---
10 [2]	11 47	----	----	----	---	---
11	11 45	9377	−17. 0	− 2. 5	---	54
13	11 54	9377	+14. 0	0. 0	46	---
15	11 46	9377	+41. 5	− 0. 5	46	---
19	11 48	9379	−31. 0	− 5. 0	---	154
		9380	+34. 5	−17. 0	---	139
22	11 50	9382	−64. 5	+10. 5	31	---
		9381	−33. 5	+11. 0	---	46
		9379	+10. 0	− 5. 0	---	93
		9380	+83. 0	−15. 0	154	---
23	11 41	9379	+23. 5	− 5. 0	77	---
		9383	+29. 0	−11. 0	---	131
24	11 47	9382	−41. 5	+11. 0	---	154
		9381	− 3. 5	+10. 5	---	15
		9379	+37. 0	− 5. 0	46	---
		9383	+41. 0	−10. 0	---	77
25	11 42	9382	−27. 5	+10. 5	---	432
		908c	+42. 5	− 6. 5	---	15
		9379	+50. 0	− 5. 0	15	---
		9383	+57. 0	− 9. 5	15	---
26	11 39	9382	−14. 5	+11. 0	---	617
		9384	+41. 5	+11. 5	---	139
27	11 40	9382	− 1. 0	+11. 0	---	556
		9384	+55. 5	+11. 0	---	262
29	11 44	9382	+26. 0	+11. 5	---	201
		9384	+87. 0	+11. 0	---	154
30	11 44	9382	+39. 5	+10. 5	---	154
31	11 39	9385	+39. 5	−10. 5	---	31
		9382	+53. 0	+10. 5	---	77
Sept. 2 [2]	11 40	----	----	----	---	---
3 [2]	11 43	----	----	----	---	---
7 [2]	11 44	----	----	----	---	---
8 [2]	11 45	----	----	----	---	---
9 [2]	11 44	----	----	----	---	---
13	11 45	9388	−75. 0	+ 9. 5	309	---
		9387	+54. 0	−12. 0	---	185
14	12 58	9388	−60. 0	+ 9. 5	494	---
		9387	+70. 0	−12. 0	---	177
15	11 52	9389	−57. 5	− 6. 5	---	139
		9388	−47. 0	+ 9. 5	370	---
16	11 51	9389	−43. 5	− 6. 5	---	139
		9388	−34. 0	+ 9. 5	401	---

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1921	h m		°	°		
Sept. 17	12 10	9389	−28. 5	− 6. 5	---	108
		9388	−20. 0	+ 9. 5	370	---
19	11 50	9389	− 1. 5	− 6. 0	---	77
		9388	+ 7. 0	+ 9. 5	340	---
20	11 50	9389	+14. 0	− 5. 5	---	69
		9388	+20. 0	+ 9. 5	370	---
22	11 50	9389	+45. 5	− 5. 5	---	100
		9388	+46. 0	+ 9. 5	309	---
23	11 50	9388	+60. 0	+ 9. 5	370	---
		9389	+61. 0	− 5. 5	131	---
24	11 50	9388	+73. 0	+ 9. 5	370	---
		9389	+75. 0	− 6. 5	93	---
28	11 50	9391	+64. 5	+ 8. 5	---	556
29	11 50	9391	+78. 0	+ 8. 5	---	617
Oct. 1[2]	11 50	----	----	----	---	---
4[2]	11 55	----	----	----	---	---
5[2]	11 50	----	----	----	---	---
6[2]	11 52	----	----	----	---	---
7[2]	11 52	----	----	----	---	---
8	12 11	9392	−47. 0	0. 0	---	77
		910b	+28. 0	−12. 0	---	54
10	11 50	9393	−78. 0	+11. 5	77	---
11	11 50	9393	−65. 0	+11. 0	46	---
		9392	− 6. 5	0. 0	---	62
		9394	−32. 0	−18. 0	---	15
12	11 43	9393	−50. 5	+11. 0	31	---
		9392	+ 8. 5	− 0. 5	---	31
		9394	−18. 0	−17. 5	46	---
13	11 46	9393	−37. 5	+11. 0	31	---
		9392	+21. 5	0. 0	---	54
14	11 45	9395	−80. 0	+ 7. 0	93	---
		9393	−24. 0	+11. 5	23	---
15	11 45	9395	−69. 0	+ 7. 5	93	---
17	11 47	9395	−40. 5	+ 8. 0	139	---
18	11 47	9395	−27. 5	+ 8. 0	123	---
19	11 45	9395	−14. 0	+ 7. 5	93	---
20	11 41	9395	− 0. 5	+ 7. 5	77	---
21	11 54	9395	+12. 5	+ 7. 0	77	---
22	11 46	9395	+26. 0	+ 6. 5	46	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1921	h m		°	°		
Oct. 24	11 45	9397	−43. 0	+ 3. 5	---	617
		9396	+28. 0	+ 8. 0	---	432
		9395	+52. 0	+ 6. 5	23	---
25	11 41	9397	−28. 5	+ 4. 0	---	679
		9396	+41. 5	+ 8. 5	---	525
26	11 45	9397	−15. 5	+ 3. 0	---	525
		9396	+55. 5	+ 7. 5	---	772
27	11 46	9397	− 2. 5	+ 3. 0	---	432
		9396	+69. 0	+ 7. 5	---	864
28	11 40	9398	−29. 5	+10. 5	---	54
		9397	+10. 0	+ 3. 0	---	370
29	11 41	9397	+24. 0	+ 3. 5	---	340
Nov. 1	11 53	9397	+68. 0	+ 4. 0	170	---
4[2]	11 45	----	----	----	---	---
5[2]	11 45	----	----	----	---	---
7[2]	11 45	----	----	----	---	---
8[2]	11 46	----	----	----	---	---
15	11 44	9399	−35. 5	+ 7. 5	432	---
17	11 41	9400	−84. 0	+ 4. 0	401	---
		9399	− 9. 0	+ 8. 5	77	---
18	11 42	9401	−85. 0	− 8. 0	185	---
		9400	−67. 0	+ 3. 5	131	---
		9399	+ 4. 5	+ 7. 5	---	370
19	11 40	9401	−74. 0	− 7. 0	---	617
		9400	−54. 5	+ 4. 0	123	---
		9399	+18. 0	+ 7. 0	---	370
21	11 39	9401	−46. 5	− 6. 5	---	617
		9400	−28. 0	+ 3. 5	123	---
		9399	+42. 5	+ 7. 5	---	370
22	11 41	9401	−32. 5	− 7. 0	---	617
		9399	+56. 5	+ 7. 5	340	---
30	11 49	9401	+80. 0	− 5. 5	370	---
Dec. 1[2]	11 47	----	----	----	---	---
3[2]	11 45	----	----	----	---	---
6[2]	11 48	----	----	----	---	---
7[2]	11 45	----	----	----	---	---
12	12 6	9404	−35. 0	+ 9. 5	---	432
15	11 46	9407	−83. 5	− 5. 5	201	---
		9404	+ 5. 0	+ 9. 5	---	556
17	11 44	9407	−53. 5	− 5. 5	---	370
		9404	+32. 5	+ 9. 5	---	617

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1921	h m		°	°		
Dec. 20	11 46	9407	−13. 0	− 5. 0	---	370
		9408	+28. 0	+12. 5	---	108
		9404	+69. 0	+10. 5	---	309
21	11 40	9407	+ 1. 0	− 4. 5	---	309
		9408	+40. 0	+13. 5	---	77
		9404	+83. 0	+12. 5	46	---
22	11 49	9407	+15. 0	− 4. 5	---	247
		9408	+54. 0	+12. 0	---	93
27	11 45	9410	−28. 5	+12. 0	---	123
		9407	+85. 0	− 4. 5	---	185
28	11 42	9410	−14. 5	+11. 5	---	77
31 [2]	11 40	----	----	----	---	---
1922						
Jan. 2 [2]	11 49	----	----	----	---	---
6	11 45	9412	−47. 5	+ 7. 5	---	46
		9411	+54. 5	− 7. 5	---	31
7	11 45	9412	−33. 0	+ 7. 5	---	46
		9411	+70. 0	− 7. 5	---	77
9	11 46	9414	−59. 5	+12. 0	---	62
		9412	− 6. 5	+ 8. 0	---	46
		913f	+18. 5	−16. 0	---	15
10	11 46	9414	−46. 5	+12. 0	---	39
		9412	+ 7. 0	+ 8. 0	---	46
13	11 45	9415	−53. 5	− 5. 0	139	---
14	11 50	9415	−39. 5	− 5. 5	139	---
		9412	+53. 0	+ 6. 5	---	62
24 [2]	11 48	----	----	----	---	---
25 [2]	11 54	----	----	----	---	---
30 [2]	11 52	----	----	----	---	---
31 [2]	11 52	----	----	----	---	---
Feb. 2	11 57	9416	− 5. 5	− 6. 5	---	8
3	11 51	9416	+ 8. 0	− 6. 5	---	8
4 [2]	11 49	----	----	----	---	---
6	11 48	9419	−10. 0	−13. 5	8	---
8	11 50	9421	−65. 0	− 6. 5	---	31
		9420	+ 3. 0	+11. 0	---	170
11	12 1	9421	−24. 0	− 5. 0	46	---
		9422	−23. 5	− 7. 5	---	247
		9420	+45. 0	+11. 0	---	494
13	12 51	9421	+ 3. 5	− 4. 5	39	---
		9422	+ 5. 0	− 7. 5	---	556
		9420	+71. 0	+11. 5	---	1049

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1922	h m		°	°		
Feb. 17	11 51	9421	+56. 0	− 4. 5	46	---
		9422	+57. 5	− 7. 0	---	216
18	11 50	9423	−80. 5	− 5. 5	---	185
		9421	+70. 0	− 4. 5	31	---
		9422	+71. 0	− 7. 5	---	247
20	11 56	9423	−54. 5	− 5. 5	139	---
22	11 48	9423	−27. 5	− 6. 5	77	---
23	11 45	9423	−14. 5	− 6. 5	77	---
24	11 50	9423	− 1. 0	− 6. 5	108	---
25	11 51	9426	−67. 5	+ 8. 5	---	8
		9425	−57. 5	+15. 5	93	---
		9424	−55. 0	+12. 5	---	31
		9423	+12. 5	− 6. 0	77	---
28	11 57	9426	{−28. 5	+10. 5	62	---
			−25. 5	+ 9. 0	---	216
			−21. 0	+ 8. 5	231	---
		9424	−15. 0	+12. 5	---	293
		9427	{− 2. 0	+ 7. 0	---	15
			+ 1. 5	+ 8. 0	77	---
		9423	+52. 5	− 6. 5	139	---
Mar. 3	11 46	9430	−45. 0	+14. 0	370	---
		9429	−42. 5	+ 9. 5	---	494
		9426	{+ 9. 5	+11. 5	386	---
			+19. 0	+ 8. 5	---	370
		9424	{+21. 5	+14. 0	93	---
			+22. 0	+12. 5	216	---
			+22. 5	+ 9. 0	309	---
			+28. 5	+13. 0	---	154
5	11 47	9431	−27. 0	+ 8. 0	---	108
		9430	−18. 0	+14. 0	293	---
		9429	−15. 5	+11. 0	---	401
		9426	+35. 0	+12. 0	293	---
		9424	{+47. 5	+11. 5	---	1019
			+57. 5	+12. 0	---	77
6	11 48	9432	−72. 5	− 4. 5	---	432
		9430	− 5. 0	+14. 0	231	---
		9429	− 2. 5	+11. 5	---	617
		9426	+49. 0	+11. 5	401	---
		9424	+62. 5	+11. 0	---	741
8	11 51	9432	−45. 5	− 5. 0	---	679
		9430	+21. 5	+14. 5	262	---
		9429	+23. 5	+11. 5	---	401
		9426	+78. 0	+12. 5	---	370
9	11 31	9434	−45. 5	+ 7. 5	---	108
		9432	−33. 0	− 4. 5	---	494
		9430	+34. 5	+14. 0	309	---
		9429	+37. 5	+12. 0	---	309
12	11 42	9434	{− 7. 5	+ 7. 5	---	31
			− 3. 5	+ 8. 5	108	---
		9432	+ 8. 5	− 4. 5	---	710
		9435	+47. 5	−17. 0	---	185
		9429–30	+70. 0	+15. 0	---	309

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1922	h m		°	°		
Mar. 13	11 58	9434	+10.0	+ 9.5	108	---
		9432	+22.5	− 4.5	---	432
		9435	+62.5	−16.5	---	108
16	11 50	9434	+50.5	+ 9.5	108	---
		9432	+65.0	− 5.0	---	93
17	11 51	9434	+64.5	+ 9.5	46	---
18	11 53	9437	+52.5	−12.0	---	77
		9434	+78.0	+ 9.5	---	123
21 [2]	12 37	----	----	----	---	---
22 [2]	11 54	----	----	----	---	---
23	11 50	9439	−74.5	+ 9.0	---	293
24	11 57	9441	−78.0	+ 9.0	---	154
		9439	−59.5	+ 9.0	---	309
25	11 50	9441	−64.5	+ 9.5	39	---
		9439	−46.0	+10.5	---	247
		9440	−35.0	+11.5	---	77
29	11 45	9444	−59.5	+12.5	93	---
		9441	− 9.5	+ 9.0	39	---
		9439	+11.0	+ 8.5	108	---
Apr. 1	11 40	9447	−64.0	+11.5	46	---
		9444	−19.0	+11.5	69	---
		9439	+51.0	+ 8.0	62	---
3	11 40	9447	−38.5	+10.5	---	62
		9444	+ 7.0	+12.0	77	---
		9439	+75.0	+ 8.0	---	93
5	12 37	9444	+34.5	+11.5	69	---
10 [2]	11 49	----	----	----	---	---
11 [2]	11 50	----	----	----	---	---
12 [2]	11 52	----	----	----	---	---
13 [2]	11 49	----	----	----	---	---
15 [2]	11 53	----	----	----	---	---
20 [2]	11 48	----	----	----	---	---
22	11 48	9449	−53.5	+ 7.5	---	31
24	11 45	9450	−73.5	+ 7.0	---	123
		9449	−28.0	+ 7.5	---	15
			−23.0	+ 6.0	---	15
25	11 46	9450	−58.5	+ 7.0	---	62
		9449	− 8.5	+ 5.0	---	15
26	12 8	9450	−45.0	+ 6.5	---	62
27	11 47	9450	−32.5	+ 6.5	15	---
		9449	+12.0	+ 7.5	---	15
28	11 45	9450	−19.0	+ 6.5	---	31

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1922	h m		°	°		
Apr. 29	11 53	9450	− 6.0	+ 6.0	---	23
May 1	11 50	9451	−26.5	+10.5	154	---
			−23.5	+11.0	---	77
			−19.5	+ 9.0	108	---
2	11 47	9451	−13.5	+10.0	123	---
			−11.5	+11.0	---	77
			− 5.5	+ 9.0	139	---
5	11 46	9451	+25.5	+ 9.5	46	---
			+35.0	+ 9.0	108	---
7	11 38	9451	+62.5	+10.5	108	---
8	11 51	9451	+76.5	+10.5	108	---
9 [2]	11 44	----	----	----	---	---
11 [2]	11 56	----	----	----	---	---
13 [2]	11 48	----	----	----	---	---
14 [2]	11 59	----	----	----	---	---
15 [2]	11 56	----	----	----	---	---
16 [2]	11 45	----	----	----	---	---
19 [2]	11 49	----	----	----	---	---
20 [2]	11 48	----	----	----	---	---
21 [2]	11 43	----	----	----	---	---
22 [2]	11 46	----	----	----	---	---
23 [2]	11 46	----	----	----	---	---
24	11 49	9452	−70.0	+ 8.5	---	77
25	11 50	9452	−58.0	+ 8.5	---	46
28	11 47	9452	−17.5	+ 8.5	---	15
29	11 47	9452	− 4.5	+ 8.5	---	15
30	11 47	9452	+ 8.5	+ 8.5	---	77
31	11 48	9452	+22.5	+ 8.0	---	62
June 3 [2]	11 56	----	----	----	---	---
4 [2]	11 40	----	----	----	---	---
6 [2]	11 41	----	----	----	---	---
7 [2]	11 45	----	----	----	---	---
8	11 33	9454	−23.5	+ 8.0	---	15
9 [2]	11 53	----	----	----	---	---
10 [2]	11 55	----	----	----	---	---

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1922	h m		°	°		
June 11	11 39	9456	−76. 0	+ 9. 0	---	62
		9455	− 5. 0	+ 6. 0	---	15
		9454	+17. 5	+ 8. 5	8	---
12	11 45	9456	−63. 5	+ 8. 5	---	62
		9454	+30. 5	+ 8. 5	---	31
13	11 49	9456	−50. 0	+ 8. 5	---	31
15	11 46	9457	+35. 0	− 8. 5	---	46
		9454	+72. 5	+ 9. 5	---	62
16	11 47	9457	+48. 0	− 9. 0	---	62
17	12 16	9457	+61. 5	− 9. 5	---	31
18 [2]	11 36	----	----	----	---	---
19 [2]	11 44	----	----	----	---	---
21	11 38	9458	+12. 0	− 7. 5	---	15
22	11 44	9458	+26. 5	− 7. 0	8	---
23 [2]	11 44	----	----	----	---	---
24 [2]	11 48	----	----	----	---	---
25 [2]	11 47	----	----	----	---	---
26 [2]	11 48	----	----	----	---	---
27 [2]	11 25	----	----	----	---	---
28 [2]	11 55	----	----	----	---	---
30 [2]	11 43	----	----	----	---	---
July 1 [2]	11 48	----	----	----	---	---
2 [2]	11 41	----	----	----	---	---
3 [2]	11 48	----	----	----	---	---
5	11 48	9460	−69. 5	−11. 5	---	46
		9459	−15. 0	+ 8. 5	---	23
6	11 45	9460	−56. 5	−11. 0	---	31
		9459	− 2. 0	+ 8. 5	---	123
7	11 48	9460	−42. 5	−10. 0	---	15
		9459	+13. 5	+ 9. 5	---	46
8	11 40	9461	−59. 5	+11. 5	---	31
		9460	−29. 0	−10. 5	---	31
		9459	+26. 5	+10. 0	---	77
9	11 43	9461	−45. 0	+11. 5	---	46
		9460	−15. 0	−10. 0	15	---
10	11 45	9461	−27. 0	+11. 5	---	15
		9460	− 2. 0	− 9. 5	---	31
11	11 50	9461	−13. 0	+10. 5	8	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1922	h m		°	°		
July 12	11 41	9461	+ 1. 5	+10. 5	8	---
13 [2]	11 50	----	----	----	---	---
15 [2]	11 45	----	----	----	---	---
17 [2]	11 47	----	----	----	---	---
18	11 48	9462	−60. 5	− 6. 5	---	15
19	11 53	9462	−47. 5	− 7. 0	---	278
21	11 46	9462	−21. 5	− 6. 5	---	370
22	11 48	9462	− 6. 5	− 6. 5	---	340
23	11 47	9462	+ 5. 5	− 6. 0	---	247
24	11 52	9462	{+15. 0	− 6. 5	---	31
			{+22. 5	− 6. 0	185	---
25	11 50	9462	{+28. 5	− 7. 0	---	15
			{+36. 0	− 6. 0	---	154
28	11 46	9462	+80. 5	− 6. 5	---	93
29 [2]	11 43	----	----	----	---	---
31 [2]	11 44	----	----	----	---	---
Aug. 1 [2]	11 36	----	----	----	---	---
2	11 48	9464	−78. 5	+10. 0	46	---
3	11 39	9464	−65. 0	+10. 0	46	---
4	11 39	9464	−52. 0	+10. 0	31	---
5	11 40	9464	−37. 5	+10. 0	15	---
8 [2]	11 37	----	----	----	---	---
10 [2]	11 36	----	----	----	---	---
12 [2]	11 53	----	----	----	---	---
15 [2]	11 44	----	----	----	---	---
16 [2]	11 40	----	----	----	---	---
17 [2]	11 41	----	----	----	---	---
18 [2]	11 38	----	----	----	---	---
19 [2]	11 39	----	----	----	---	---
21 [2]	11 39	----	----	----	---	---
22 [2]	11 38	----	----	----	---	---
23 [2]	11 37	----	----	----	---	---
26	11 36	9465	+49. 5	−12. 5	---	463

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1922	h m		°	°		
Aug. 29	11 36	9466	+48.0	+3.5	---	216
31	11 41	9466	{+70.5 {+79.5	+3.5 +4.5	--- ---	31 93
Sept. 1[2]	11 50	----	----	----	---	---
3[2]	11 54	----	----	----	---	---
4[2]	11 53	----	----	----	---	---
5[2]	11 54	----	----	----	---	---
6[2]	11 49	----	----	----	---	---
7[2]	11 50	----	----	----	---	---
10[2]	11 43	----	----	----	---	---
11[2]	11 46	----	----	----	---	---
13	11 48	9469	−68.5	−13.0	---	185
14	11 44	9469	−54.5	−12.0	---	170
15	11 50	9469	−42.0	−12.5	---	123
16	11 48	9469	−28.0	−12.0	123	---
17	12 6	9469	−14.5	−12.0	123	---
18	11 56	9469	−1.5	−12.0	108	---
19	12 8	9469	+11.5	−12.0	108	---
22	11 49	9469	+51.0	−12.5	93	---
23	11 51	9469	+64.0	−12.5	108	---
24	11 53	9469	+77.5	−13.0	93	---
25[2]	11 50	----	----	----	---	---
26[2]	11 50	----	----	----	---	---
27[2]	11 49	----	----	----	---	---
28[2]	11 51	----	----	----	---	---
29	11 48	9470	−6.0	−9.5	---	8
30	11 47	9470	+7.5	−9.0	---	15
Oct. 1	11 48	9470	+20.5	−9.0	---	31
2	11 48	9470	+34.0	−9.0	---	31
3	11 48	9470	+47.5	−8.5	---	31
4	11 50	9470	+60.5	−8.5	---	15
5[2]	11 50	----	----	----	---	---
6[2]	11 53	----	----	----	---	---
1922	h m		°	°		
Oct. 8	11 42	9471	−85.0	+13.0	---	8
11	11 46	9472 9471	−59.5 −46.0	−12.0 +15.0	15 ---	--- 123
12	11 53	9472 9471	−46.0 −33.5	−12.0 +15.5	8 ---	--- 46
13	11 49	9471	−21.5	+15.5	---	15
15[2]	11 45	----	----	----	---	---
16[2]	11 54	----	----	----	---	---
17	12 43	9473	+21.5	+13.0	---	46
18	11 59	9473	+35.5	+12.0	---	8
19	11 51	9473 9475	+44.5 +55.0	+12.5 −6.5	8 ---	--- 123
20	11 48	9473 9475	+57.0 +67.5	+13.5 −6.5	8 ---	--- 370
21	11 45	9475	+80.0	−6.5	---	370
22[2]	11 47	----	----	----	---	---
24[2]	11 22	----	----	----	---	---
25[2]	11 47	----	----	----	---	---
26[2]	11 51	----	----	----	---	---
27[2]	11 47	----	----	----	---	---
29	11 44	9476	−71.0	−14.5	---	15
30	11 50	9476	−58.0	−14.0	---	15
31	11 46	9476	−47.5	−14.0	---	46
Nov. 1	11 51	9476	−33.5	−14.0	---	46
2	11 55	9476	−17.5	−14.0	---	15
3[2]	12 10	----	----	----	---	---
5	11 51	9477	−74.0	−6.5	401	---
6	11 56	9477	−60.0	−6.0	309	---
7	11 58	9477	−46.5	−6.5	293	---
8	11 45	9477	−33.5	−6.0	231	---
9	11 45	9477	−19.5	−6.0	309	---
10	11 45	9477	−5.5	−6.0	278	---
11	11 44	9477	+7.5	−6.5	278	---
12	11 48	9477	+20.5	−6.0	201	---

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1922	h m		°	°		
Nov. 13	11 45	9478	−65.0	+4.0	15	---
		9477	+33.0	−6.0	216	---
14	11 44	9478	−51.0	+4.0	15	---
		9479	−37.0	−42.0	15	---
		9477	+46.5	−6.0	201	---
16	11 54	9477	+75.0	−6.0	247	---
17 [2]	11 45	----	----	----	---	---
19 [2]	11 44	----	----	----	---	---
20	11 50	9480	+21.5	+4.0	---	77
21	11 45	9480	+34.5	+4.0	---	46
22 [2]	12 37	----	----	----	---	---
23 [2]	11 52	----	----	----	---	---
24 [2]	11 48	----	----	----	---	---
25 [2]	11 45	----	----	----	---	---
26 [2]	11 43	----	----	----	---	---
29	11 45	9482	{−80.0	−4.0	154	---
			{−67.5	−3.5	---	309
30	11 40	9482	{−65.5	−4.0	108	---
			{−54.5	−4.0	---	247
Dec. 2	11 49	9483	−75.0	−5.5	62	---
		9482	−26.5	−3.5	154	---
5	11 45	9483	−34.0	−5.5	46	---
		9482	+14.5	−3.5	154	---
6	11 46	9483	−20.5	−5.0	46	---
		9482	+27.5	−3.5	154	---
9	11 46	9483	+17.5	−5.5	---	62
		9482	+69.0	−3.0	154	---
10	11 40	9483	+31.5	−5.5	---	15
		9482	+85.0	−3.0	170	---
18 [2]	11 45	----	----	----	---	---
19 [2]	11 45	----	----	----	---	---
20 [2]	11 45	----	----	----	---	---
21 [2]	11 45	----	----	----	---	---
22	11 53	9484	−83.5	+6.5	617	---
24	11 52	9484	{−62.0	+7.0	---	432
			{−54.5	+7.5	---	741
25	11 42	9485	−66.5	+9.5	62	---
		9484	{−48.5	+7.5	---	401
			{−40.5	+7.0	---	802

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1922	h m		°	°		
Dec. 26	12 5	9486	−66.0	−3.0	77	---
		9485	−53.5	+9.5	31	---
		9484	{−34.5	+8.0	---	278
			{−27.0	+7.5	---	772
29	11 45	9486	−26.0	−3.5	31	---
		9485	−14.5	+10.0	---	62
		9484	{+4.5	+7.5	---	247
			{+13.0	+7.0	---	741
30	11 45	9486	−13.0	−4.0	31	---
		9485	−1.5	+9.5	---	46
		9484	{+18.0	+7.5	---	247
			{+27.5	+7.5	---	617
1923						
Jan. 1	11 44	9486	+15.0	−3.5	8	---
		9484	{+44.5	+7.5	---	154
			{+56.0	+7.5	---	432
2	11 51	9486	+28.0	−3.5	8	---
		9484	{+58.0	+7.5	---	216
			{+69.5	+7.0	---	525
5 [2]	11 4	----	----	----	---	---
6 [2]	11 50	----	----	----	---	---
11 [2]	11 49	----	----	----	---	---
12 [2]	11 51	----	----	----	---	---
13 [2]	11 50	----	----	----	---	---
16 [2]	11 49	----	----	----	---	---
17 [2]	11 45	----	----	----	---	---
19 [2]	11 52	----	----	----	---	---
23 [2]	11 50	----	----	----	---	---
25 [2]	11 45	----	----	----	---	---
26 [2]	11 40	----	----	----	---	---
29	11 46	9489	+52.5	+6.5	---	15
30	11 41	9489	+66 5	+6.5	---	62
Feb. 7 [2]	12 3	----	----	----	---	---
8 [2]	12 2	----	----	----	---	---
9 [2]	12 4	----	----	----	---	---
10 [2]	11 50	----	----	----	---	---
11 [2]	11 52	----	----	----	---	---
12 [2]	11 50	----	----	----	---	---
14	11 49	9490	+2.5	+12.0	---	15
15	11 49	9490	+15.5	+12.0	---	8

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1923	h m		°	°		
Feb. 16 [2]	11 48	----	----	----	---	---
18 [2]	11 53	----	----	----	---	---
19 [2]	11 49	----	----	----	---	---
21 [2]	11 48	----	----	----	---	---
23 [2]	12 6	----	----	----	---	---
24 [2]	11 47	----	----	----	---	---
25 [2]	11 58	----	----	----	---	---
Mar. 2 [2]	11 48	----	----	----	---	---
3 [2]	11 50	----	----	----	---	---
7 [2]	11 49	----	----	----	---	---
8 [2]	11 51	----	----	----	---	---
9 [2]	12 20	----	----	----	---	---
10 [2]	12 3	----	----	----	---	---
14 [2]	12 51	----	----	----	---	---
17 [2]	11 50	----	----	----	---	---
18 [2]	11 50	----	----	----	---	---
20 [2]	11 50	----	----	----	---	---
21 [2]	11 50	----	----	----	---	---
23 [2]	11 54	----	----	----	---	---
24 [2]	11 50	----	----	----	---	---
25	11 51	9492	+61. 5	+ 7. 5	---	31
26 [2]	11 50	----	----	----	---	---
27 [2]	11 50	----	----	----	---	---
28 [2]	11 52	----	----	----	---	---
29	11 52	9493	−40. 5	+ 5. 5	---	46
30	11 49	9493	−27. 5	+ 5. 0	---	139
31	11 56	9493	−14. 0	+ 4. 5	---	123
Apr. 1	11 52	9493	+ 1. 0	+ 4. 5	---	46
2	11 50	9493	+18. 5	+ 5. 0	15	---
3 [2]	11 47	----	----	----	---	---
4 [2]	11 55	----	----	----	---	---
6 [2]	11 48	----	----	----	---	---
1923	h m		°	°		
Apr. 7 [2]	11 50	----	----	----	---	---
9 [2]	11 51	----	----	----	---	---
10 [2]	11 53	----	----	----	---	---
11 [2]	11 50	----	----	----	---	---
12 [2]	11 48	----	----	----	---	---
16 [2]	11 49	----	----	----	---	---
18	11 54	9496	−72. 5	− 4. 5	15	---
19 [2]	11 52	----	----	----	---	---
20	11 51	9496	−44. 5	− 4. 5	---	62
21	12 2	9496	−31. 5	− 5. 0	---	93
22	11 55	9496	−17. 0	− 5. 5	---	62
24	11 45	9496	+10. 5	− 5. 5	31	---
25	11 46	9496	+24. 0	− 5. 5	---	31
26	11 46	9496	+37. 5	− 5. 5	31	---
27	11 50	9496	+51. 5	− 5. 0	---	62
30 [2]	11 56	----	----	----	---	---
May 1 [2]	11 53	----	----	----	---	---
2 [2]	11 50	----	----	----	---	---
3 [2]	11 50	----	----	----	---	---
4 [2]	11 50	----	----	----	---	---
5 [2]	11 48	----	----	----	---	---
6 [2]	11 48	----	----	----	---	---
7 [2]	11 53	----	----	----	---	---
8 [2]	11 51	----	----	----	---	---
9 [2]	12 14	----	----	----	---	---
12	11 54	9497	− 2. 0	+ 8. 0	---	23
14 [2]	11 50	----	----	----	---	---
17 [2]	11 51	----	----	----	---	---
18 [2]	11 55	----	----	----	---	---
19 [2]	11 55	----	----	----	---	---
20 [2]	12 0	----	----	----	---	---
21 [2]	11 55	----	----	----	---	---

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1923	h m		°	°		
May 22 [2]	11 54	----	----	----	---	---
24	11 52	9499	−36. 5	− 9. 5	---	62
25	11 51	9499	−23. 0	−10. 0	---	46
26 [2]	11 50	----	----	----	---	---
27	11 56	9500	−81. 5	+10. 0	---	31
28	11 52	9500	−67. 5	+10. 0	---	93
29	11 51	9500	−52. 5	+ 9. 5	77	---
31	11 52	9500	−25. 5	+ 9. 5	46	---
June 1	11 55	9501	−43. 5	− 7. 0	15	---
		9500	−12. 5	+ 9. 5	23	---
2	11 52	9501	−30. 0	− 7. 0	31	---
3	11 49	9501	−16. 0	− 7. 5	8	---
4 [2]	11 50	----	----	----	---	---
5 [2]	11 51	----	----	----	---	---
6 [2]	11 50	----	----	----	---	---
7 [2]	11 56	----	----	----	---	---
8 [2]	11 51	----	----	----	---	---
9 [2]	11 52	----	----	----	---	---
10 [2]	11 50	----	----	----	---	---
14 [2]	11 50	----	----	----	---	---
15 [2]	11 48	----	----	----	---	---
16 [2]	11 49	----	----	----	---	---
17 [2]	11 49	----	----	----	---	---
18	11 53	9502	−38. 5	− 4. 0	---	62
19	11 51	9502	−25. 5	− 3. 5	---	62
21	11 54	9502	+ 2. 0	− 3. 5	---	31
22	11 53	9502	+16. 5	− 3. 0	31	---
23	11 52	9502	+31. 0	− 3. 0	23	---
24	11 52	9502	+44. 0	− 3. 0	15	---
25	11 58	9504	−34. 0	+ 7. 5	---	123
		9502	+58. 0	− 3. 0	15	---
		9503	+58. 5	+ 4. 0	---	123
26	11 45	9504	−21. 0	+ 8. 0	---	154
		9503	+75. 0	+ 4. 5	---	123

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1923	h m		°	°		
June 27	11 48	9504	− 7. 0	+ 8. 0	---	123
29	11 50	9504	+21. 0	+ 8. 0	---	370
30	11 48	9504	+33. 0	+ 8. 5	---	432
July 1	11 46	9504	+46. 5	+ 8. 5	---	309
2	11 46	9504	+61. 5	+ 8. 5	---	154
3	11 49	9504	+76. 5	+ 8. 5	62	---
4 [2]	11 48	----	----	----	---	---
5 [2]	11 48	----	----	----	---	---
6 [2]	11 45	----	----	----	---	---
7 [2]	12 8	----	----	----	---	---
8 [2]	11 47	----	----	----	---	---
9 [2]	11 50	----	----	----	---	---
11 [2]	11 42	----	----	----	---	---
13 [2]	11 42	----	----	----	---	---
14 [2]	11 47	----	----	----	---	---
15 [2]	11 43	----	----	----	---	---
16 [2]	12 19	----	----	----	---	---
17 [2]	11 48	----	----	----	---	---
18 [2]	11 45	----	----	----	---	---
19 [2]	11 50	----	----	----	---	---
20 [2]	11 51	----	----	----	---	---
21 [2]	11 47	----	----	----	---	---
22	11 53	9505	−21. 0	+ 7. 0	23	---
23	11 48	9505	− 6. 0	+ 6. 5	8	---
25	11 54	9505	+23. 5	+ 7. 0	8	---
26 [2]	11 47	----	----	----	---	---
27 [2]	11 46	----	----	----	---	---
29	11 54	9506	+42. 5	+ 5. 0	---	31
Aug. 3 [2]	11 37	----	----	----	---	---
4 [2]	11 43	----	----	----	---	---
5 [2]	12 8	----	----	----	---	---
6 [2]	11 38	----	----	----	---	---

[2] No spots.

1757—29——32

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1923	h m		°	°		
Aug. 7 [2]	11 39	----	----	----	---	---
8 [2]	11 38	----	----	----	---	---
11 [2]	11 40	----	----	----	---	---
13 [2]	11 39	----	----	----	---	---
14 [2]	11 37	----	----	----	---	---
15 [2]	11 38	----	----	----	---	---
16	11 39	935a	−11. 5	+15. 5	8	---
20 [2]	11 39	----	----	----	---	---
21 [2]	11 38	----	----	----	---	---
24 [2]	14 8	----	----	----	---	---
25 [2]	11 39	----	----	----	---	---
26 [2]	11 39	----	----	----	---	---
27 [2]	11 43	----	----	----	---	---
30 [2]	11 38	----	----	----	---	---
31	11 33	9508	−55. 0	−30. 0	31	---
Sept. 1	11 39	9508	−39. 0	−29. 0	---	77
2	11 42	9508	−25. 5	−29. 5	---	77
4	11 38	9508	+ 2. 5	−28. 5	---	231
7	13 50	9509	−71. 5	+21. 5	---	108
		9508	+46. 5	−28. 5	---	123
9	11 44	9509	−45. 5	+21. 5	---	123
		9508	+75. 0	−28. 0	---	123
10	11 47	9509	−31. 0	+21. 5	---	123
11	12 13	9509	−13. 5	+21. 5	93	---
12	11 52	9509	0. 0	+21. 5	93	---
13	11 49	9509	+12. 5	+21. 5	46	---
14	11 48	9509	+21. 5	+22. 0	---	93
15	11 49	9509	+34. 5	+21. 5	---	77
16	11 48	9509	+46. 5	+21. 5	---	77
17	11 49	9510	+ 4. 5	+ 8. 5	---	23
		9509	+65. 0	+21. 0	46	---
18	11 49	9510	+19. 0	+ 8. 5	15	---
		9509	+79. 0	+21. 5	39	---
19 [2]	11 52	----	----	----	---	---
20 [2]	11 56	----	----	----	---	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1923	h m		°	°		
Sept. 23 [2]	11 43	----	----	----	---	---
24	11 46	9511	−75. 5	−18. 5	---	108
25	11 46	9511	−61. 5	−17. 5	---	201
26	11 46	9511	−47. 5	−18. 0	---	201
27	11 44	9511	−30. 0	−17. 5	---	108
28	11 47	9511	−16. 5	−17. 5	123	---
29	11 46	9511	− 4. 5	−17. 5	139	---
30	11 45	9511	+ 9. 5	−17. 0	123	---
Oct. 1	11 57	9511	+22. 5	−17. 0	123	---
2	11 47	9511	+35. 0	−17. 0	108	---
3	11 47	9511	+48. 5	−16. 5	139	---
4	11 46	9511	+61. 5	−17. 0	139	---
5	11 46	9511	+76. 0	−17. 0	154	---
6 [2]	11 47	----	----	----	---	---
7 [2]	11 45	----	----	----	---	---
8	11 45	9513	−84. 5	+ 3. 0	62	---
9	11 46	9513	−70. 5	+ 3. 0	108	---
10	11 46	9513	−56. 5	+ 3. 5	77	---
11	11 45	9513	−43. 0	+ 3. 5	77	---
12	11 45	9513	−28. 5	+ 3. 5	62	---
13	11 45	9513	−15. 0	+ 3. 5	---	62
14	11 45	9513	− 1. 5	+ 4. 0	62	---
17	11 46	9513	+39. 0	+ 4. 0	39	---
18	11 46	9513	+52. 5	+ 4. 0	31	---
20	11 48	9513	+79. 5	+ 3. 5	15	---
21 [2]	11 45	----	----	----	---	---
22	11 44	9514	−61. 5	−17. 5	46	---
		9515	−26. 5	− 5. 5	---	46
25	12 18	9514	−22. 5	−17. 0	31	---
		9515	+14. 5	− 5. 0	---	201
26	12 24	9514	− 8. 5	−16. 5	31	---
		9515	+28. 0	− 5. 5	---	154
27	11 47	9514	+ 3. 5	−16. 5	31	---
		9515	+42. 5	− 6. 5	---	77
29	12 30	9515	+73. 0	− 7. 5	---	31

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1923	h m		°	°		
Oct. 30	12 45	9514	+43.5	−17.0	15	---
31	11 44	9516	−28.0	−30.0	---	62
		9514	+56.5	−16.5	15	---
Nov. 1	11 45	9516	−15.0	−29.5	---	139
2	11 45	9516	− 2.5	−29.0	---	185
3	11 46	9516	+11.0	−29.5	---	216
7	12 53	9517	−36.5	+29.5	---	170
8	12 52	9517	−22.0	+29.0	---	170
9	11 48	9517	− 8.5	+28.5	123	---
10	11 47	9517	+ 5.0	+29.0	123	---
13	11 48	9517	+44.5	+30.5	77	---
14	11 55	9517	+56.5	+30.5	77	---
16 [2]	12 12	----	----	----	---	---
17 [2]	12 16	----	----	----	---	---
19 [2]	11 50	----	----	----	---	---
20 [2]	11 50	----	----	----	---	---
21 [2]	11 46	----	----	----	---	---
22 [2]	11 48	----	----	----	---	---
24	11 44	9518	−69.5	−23.0	69	---
25	11 44	9518	−56.5	−23.0	62	---
26	11 50	9518	−43.5	−22.5	---	31
27	11 47	9518	−29.5	−22.5	23	---
28	12 5	9518	−15.5	−23.0	8	---
Dec. 1 [2]	11 46	----	----	----	---	---
2 [2]	11 46	----	----	----	---	---
3 [2]	11 43	----	----	----	---	---
4 [2]	11 43	----	----	----	---	---
6 [2]	11 47	----	----	----	---	---
7 [2]	11 52	----	----	----	---	---
8 [2]	11 43	----	----	----	---	---
11 [2]	11 59	----	----	----	---	---
12 [2]	11 46	----	----	----	---	---
14 [2]	11 47	----	----	----	---	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1923	h m		°	°		
Dec. 15 [2]	11 47	----	----	----	---	---
16 [2]	11 47	----	----	----	---	---
17 [2]	11 50	----	----	----	---	---
18 [2]	12 3	----	----	----	---	---
19	11 47	9519	−47.5	+31.5	---	31
21	11 49	9519	−16.0	+29.5	---	93
24	11 36	9519	+23.5	+29.5	---	46
26	11 43	9519	+50.0	+29.5	---	31
28 [2]	11 46	----	----	----	---	---
29 [2]	11 39	----	----	----	---	---
1924						
Jan. 4 [2]	12 18	----	----	----	---	---
5 [2]	11 59	----	----	----	---	---
6 [2]	11 47	----	----	----	---	---
8 [2]	11 38	----	----	----	---	---
9 [2]	11 38	----	----	----	---	---
12 [2]	12 59	----	----	----	---	---
14 [2]	11 38	----	----	----	---	---
15 [2]	11 39	----	----	----	---	---
17 [2]	11 42	----	----	----	---	---
18 [2]	11 40	----	----	----	---	---
19 [2]	11 39	----	----	----	---	---
21 [2]	11 39	----	----	----	---	---
22 [2]	11 44	----	----	----	---	---
23 [2]	11 37	----	----	----	---	---
25 [2]	11 40	----	----	----	---	---
27 [2]	11 37	----	----	----	---	---
28 [2]	11 36	----	----	----	---	---
29 [2]	11 37	----	----	----	---	---
Feb. 1 [2]	11 59	----	----	----	---	---
2 [2]	11 38	----	----	----	---	---
4 [2]	11 59	----	----	----	---	---
7 [2]	12 4	----	----	----	---	---

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1924	h m		°	°		
Feb. 8 [2]	11 55	----	----	----	---	---
9 [2]	11 56	----	----	----	---	---
11 [2]	11 53	----	----	----	---	---
13 [2]	11 57	----	----	----	---	---
14 [2]	12 10	----	----	----	---	---
15 [2]	11 53	----	----	----	---	---
16 [2]	11 52	----	----	----	---	---
18 [2]	11 57	----	----	----	---	---
20 [2]	11 51	----	----	----	---	---
21 [2]	11 53	----	----	----	---	---
22 [2]	11 56	----	----	----	---	---
23 [2]	11 54	----	----	----	---	---
24 [2]	11 53	----	----	----	---	---
25	11 43	9523	−24. 0	+29. 0	---	170
28	11 50	9523	+13. 0	+29. 5	---	370
Mar. 1	11 51	9523	+39. 0	+29. 5	---	216
2	11 50	9523	+52. 5	+29. 5	---	185
3	12 4	9523	+69. 0	+27. 5	154	---
4	11 53	9523	+84. 5	+28. 0	154	---
6 [2]	11 50	----	----	----	---	---
7 [2]	11 54	----	----	----	---	---
8 [2]	11 53	----	----	----	---	---
9 [2]	11 57	----	----	----	---	---
12 [2]	11 52	----	----	----	---	---
13 [2]	11 48	----	----	----	---	---
14 [2]	11 51	----	----	----	---	---
15 [2]	11 52	----	----	----	---	---
16 [2]	11 52	----	----	----	---	---
17 [2]	11 51	----	----	----	---	---
18 [2]	11 57	----	----	----	---	---
19 [2]	12 5	----	----	----	---	---
22	11 51	9525	−19. 5	+19. 5	---	31
		9524	+43. 5	−29. 5	---	15

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1924	h m		°	°		
Mar. 23	11 49	9525	− 6. 5	+20. 0	---	15
24 [2]	12 0	----	----	----	---	---
26 [2]	11 54	----	----	----	---	---
28 [2]	11 52	----	----	----	---	---
30 [2]	11 53	----	----	----	---	---
31 [2]	11 52	----	----	----	---	---
Apr. 2 [2]	11 57	----	----	----	---	---
3 [2]	11 57	----	----	----	---	---
4 [2]	11 48	----	----	----	---	---
8 [2]	11 54	----	----	----	---	---
12 [2]	12 20	----	----	----	---	---
13 [2]	11 52	----	----	----	---	---
14 [2]	11 49	----	----	----	---	---
15 [2]	11 48	----	----	----	---	---
16	11 48	9527	−48. 5	+21. 5	---	31
19	11 54	9528–29	−20. 0	−28. 5	---	247
		9527	−11. 5	+22. 5	---	123
20	11 54	9528–29	− 6. 0	−28. 0	---	278
		9527	+ 0. 5	+24. 5	---	62
			+ 5. 5	+20. 5	---	15
21	13 2	9528–29	+ 6. 0	−28. 0	---	278
22	12 35	9528–29	+19. 0	−27. 5	---	401
23	11 52	9528–29	+32. 5	−28. 0	---	278
24	11 49	9528–29	+45. 0	−28. 0	---	278
25	11 49	9528–29	+60. 0	−28. 5	---	247
26	11 48	9528–29	+74. 0	−27. 5	---	247
27 [2]	11 47	----	----	----	---	---
29 [2]	11 45	----	----	----	---	---
May 1 [2]	11 53	----	----	----	---	---
2 [2]	12 1	----	----	----	---	---
3 [2]	11 59	----	----	----	---	---
5 [2]	11 51	----	----	----	---	---
6 [2]	11 52	----	----	----	---	---
10	12 8	9531	−60. 0	−21. 5	---	62
		9530	+12. 0	+32. 0	---	93

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1924	h m		°	°		
May 13	11 49	9532	−63. 0	−29. 5	---	31
		9531	−20. 0	−20. 5	---	216
		9530	+50. 0	+33. 0	---	15
15	11 53	9533	−55. 0	−28. 0	8	---
		9532	−38. 5	−30. 5	31	---
		9531	+ 6. 0	−21. 5	---	370
17	11 50	9532	−11. 0	−29. 5	15	---
		9531	+32. 5	−21. 0	---	278
18	11 56	9534	−69. 0	−22. 5	31	---
		9535	−64. 0	+38. 0	46	---
		9531	+45. 0	−20. 5	---	154
19	11 52	9534	−55. 0	−22. 0	46	---
		9535	−50. 0	+37. 5	31	---
		9531	+58. 0	−20. 5	---	201
22	11 53	9534	−15. 0	−22. 0	31	---
		9535	−16. 5	+37. 0	---	123
23	11 51	9534	− 2. 5	−21. 5	23	---
		9535	− 3. 5	+37. 0	---	31
25	11 51	9534	+22. 5	−21. 0	15	---
26	11 51	9534	+36. 0	−21. 0	15	---
30	11 49	9537	−70. 0	+31. 5	---	494
31	11 50	9537	−61. 5	+32. 0	---	679
June 2	11 51	9537	−36. 5	+32. 0	---	741
3	11 57	9537	−24. 0	+31. 5	---	710
4	11 50	9537	−12. 0	+31. 5	---	802
5	11 49	9537	+ 0. 5	+31. 0	---	864
7	11 51	9537	+24. 5	+31. 0	---	895
8	11 52	9537	+37. 0	+30. 5	---	586
14	11 57	9542	− 1. 0	−25. 0	---	46
		9541	+21. 0	+22. 5	---	185
15	11 58	9542	+12. 5	−25. 5	---	31
		9541	+34. 5	+22. 5	---	201
16	11 50	9542	+26. 0	−26. 0	---	15
		9541	+46. 5	+23. 0	---	185
17	11 47	9542	+38. 5	−25. 5	---	77
		9541	+65. 5	+22. 5	139	---
18	11 50	9542	+52. 0	−25. 5	---	62
19	11 48	9543	−45. 0	+37. 5	---	62
		9542	+69. 0	−24. 5	62	---
20	11 55	9543	−32. 0	+37. 5	---	46
22	11 46	9543	− 0. 5	+37. 0	62	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1924	h m		°	°		
June 23	11 46	9543	+11. 5	+36. 5	46	---
25	11 47	9543	+37. 5	+36. 5	62	---
26	11 41	9543	+50. 0	+36. 5	31	---
29	11 58	9545	−52. 5	+31. 5	---	216
30	11 46	9545	−41. 5	+31. 5	---	154
July 2	11 48	9546	−40. 5	+19. 0	---	31
		9547	−40. 0	+25. 0	---	46
		9545	−15. 5	+32. 0	---	139
3	11 50	9547	−28. 5	+25. 5	---	31
		9546	−25. 0	+19. 5	---	31
		9545	− 3. 5	+32. 5	---	139
4	11 51	9547	−15. 5	+25. 0	---	15
		9546	−13. 0	+19. 5	---	108
		9545	+10. 0	+32. 0	---	108
7	12 20	9549	−68. 0	+22. 0	---	309
		9550	−57. 5	−26. 0	31	---
		9546	+31. 5	+20. 0	77	---
		9545	+52. 5	+33. 5	---	62
9	11 54	9549	−41. 5	+22. 0	---	278
		9550	−34. 5	−27. 5	15	---
		9552	−26. 0	+ 5. 5	---	93
		9546	+59. 0	+20. 0	77	---
		9545	+80. 0	+34. 0	31	---
10	11 47	9549	−28. 5	+21. 5	---	247
		9550	−21. 0	−28. 0	31	---
		9552	−11. 5	+ 5. 0	---	93
		9546	+72. 0	+20. 0	62	---
11	11 47	9549	−15. 5	+21. 5	---	185
		9550	− 9. 0	−28. 5	15	---
		9552	+ 3. 0	+ 5. 0	---	216
12	11 49	9549	− 2. 5	+21. 0	---	216
		9552	+17. 5	+ 5. 0	---	278
13	11 48	9549	+10. 5	+21. 5	---	123
		9552	+31. 0	+ 5. 0	---	247
14	11 48	9549	+23. 5	+21. 0	---	154
		9552	+45. 0	+ 5. 0	---	247
15	11 55	9549	+37. 5	+21. 5	---	154
		9552	+58. 5	+ 5. 0	---	247
16	11 50	9549	+51. 5	+21. 5	---	216
		9552	+73. 0	+ 5. 0	216	---
17	12 36	9549	+64. 5	+19. 0	---	154
18	11 50	9549	+77. 5	+21. 5	---	139
19[2]	11 49	----	----	----	---	---
20	11 46	9553	−61. 0	+19. 5	31	---

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1924	h m		°	°		
July 21	11 47	9553	−48.5	+20.0	15	---
		9555	−27.0	+27.5	---	62
		9554	+49.0	+26.5	15	---
23	11 54	9555	+1.0	+27.5	---	62
		9554	+76.0	+26.0	62	---
24	11 49	9555	+14.5	+28.0	---	77
25	12 12	9555	+28.0	+28.5	---	31
26	11 44	9556	−57.5	+34.0	---	108
		9555	+43.0	+28.0	15	---
27	11 47	9556	−44.5	+34.5	---	123
28	11 47	9556	−30.5	+34.5	---	123
29	11 47	9556	−18.0	+35.0	---	123
30	11 50	9556	−5.5	+35.0	---	108
Aug. 1	11 39	9558	−71.0	+5.0	---	247
		9556	+25.5	+34.5	---	123
4	11 39	9560	−61.0	+24.5	93	---
		9559	−49.5	+28.0	31	---
		9558	−30.5	+5.5	201	---
		9556	+65.5	+34.0	62	---
5	11 38	9560	−49.0	+24.5	46	---
		9559	−36.0	+28.5	8	---
		9558	−18.0	+5.5	170	---
		9556	+79.0	+34.0	77	---
6	11 42	9560	−36.5	+24.5	31	---
		9558	−5.0	+5.0	170	---
7	11 40	9560	−23.5	+24.5	31	---
		9558	+8.5	+5.5	154	---
8	11 36	9560	−10.0	+24.5	31	---
		9558	+21.5	+5.5	154	---
9	11 39	9560	+3.0	+24.0	15	---
		9558	+35.5	+5.0	123	---
10	12 18	9558	+50.0	+5.0	154	---
14	11 37	9563	−87.0	+16.5	123	---
		9562	+70.0	−27.0	---	123
15	11 47	9563	−72.5	+16.0	123	---
16	11 34	9563	{−70.5	+18.5	139	---
			{−59.5	+15.5	154	---
18	11 47	9563	{−44.5	+18.5	123	---
			{−32.5	+16.0	123	---
19	11 48	9563	{−31.5	+18.5	93	---
			{−19.5	+15.5	123	---
21	11 33	9563	+7.5	+15.0	108	---
1924	h m		°	°		
Aug 23	11 35	9563	{+25.0	+20.0	---	31
			{+34.5	+14.5	108	---
26	11 38	9563	+73.0	+14.0	93	---
27 [2]	11 36	----	----	----	---	---
28	11 34	9565	−72.5	+4.5	139	---
		9564	−27.0	+21.0	---	123
29	11 38	9565	−59.5	+4.5	154	---
		9564	−13.5	+21.5	---	494
30	11 36	9565	−45.5	+4.0	139	---
		9564	−0.5	+21.5	---	741
31	11 35	9565	−31.5	+4.0	108	---
		9564	+12.0	+21.0	---	772
Sept. 1	11 36	9565	−19.0	+4.0	108	---
		9564	+25.0	+20.5	---	741
2	11 41	9565	−4.5	+4.0	139	---
		9564	+38.5	+21.0	---	772
3	11 48	9565	+8.5	+4.0	123	---
		9564	+50.5	+21.5	---	741
4	11 56	9565	+21.5	+4.5	139	---
		9564	+64.5	+21.5	---	710
6	11 50	9566	+23.5	−28.5	---	15
		9565	+48.0	+4.5	108	---
7	11 46	9566	+37.5	−28.0	---	46
		9565	+62.0	+4.0	108	---
8	11 46	9566	+49.5	−28.0	---	31
		9565	+75.5	+4.0	77	---
9	12 4	9567	−64.5	+22.5	---	15
		9566	+67.5	−27.0	15	---
10	11 50	9567	−51.5	+22.5	---	123
11	11 53	9567	−37.5	+23.0	---	216
12	11 47	9567	−24.0	+23.0	---	231
13	11 45	9567	−10.5	+22.5	---	247
18	12 8	9568	−61.5	−25.0	46	---
		9567	+62.0	+21.5	62	---
23	11 45	9568	+3.5	−25.0	---	185
24	11 45	9570	−75.0	+5.5	108	---
		9568	+16.5	−25.0	---	185
25	11 48	9570	−61.0	+6.5	108	---
		9568	+30.5	−25.5	---	123
Oct. 1	11 45	9574	−70.5	+26.0	77	---
		9573	−39.0	+22.5	---	139
		9570	+20.0	+6.5	---	31

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1924	h m		°	°		
Oct 2	11 45	9574	−58.0	+25.5	77	---
		9573	−25.5	+22.0	---	154
		9570	+30.5	+ 7.0	---	62
3	11 45	9575	−75.0	−27.5	---	185
		9574	−45.5	+25.5	46	---
		9573	−12.0	+22.5	---	154
		9570	+43.0	+ 7.5	---	46
4	11 46	9575	−63.5	−28.0	---	278
		9574	−32.5	+25.5	46	---
		9573	+ 4.5	+22.5	123	---
		9570	+56.0	+ 7.0	---	31
5	11 45	9575	−51.5	−28.0	---	494
		9574	−18.5	+25.5	31	---
		9573	+18.0	+22.0	139	---
6	11 45	9575	−42.0	−28.5	---	401
		9574	− 5.5	+25.5	15	---
		9573	+31.0	+22.0	108	---
7	11 52	9575	−30.0	−29.0	---	278
		9574	+ 6.0	+25.5	15	---
		9573	+44.0	+22.0	123	---
8	11 46	9575	−17.0	−29.0	---	278
		9574	+19.5	+26.0	15	---
		9573	+58.0	+22.5	108	---
9	11 46	9575	− 5.0	−29.0	---	216
		9573	+70.0	+22.0	123	---
10	11 46	9575	+ 8.5	−29.0	---	123
		9573	+84.5	+22.5	154	---
11	11 54	9575	+21.0	−29.0	---	123
12	11 49	9575	+35.0	−28.5	---	185
13	11 46	9576	−80.5	+23.0	154	---
		9575	+48.5	−28.5	---	123
14	11 48	9576	−73.0	+24.0	---	309
		9575	+60.5	−28.0	---	93
15	11 46	9576	−59.5	+23.5	---	340
16	11 45	9576	−47.5	+23.5	---	340
17	11 46	9576	−33.5	+23.0	---	370
18	11 45	9576	−18.5	+22.5	---	401
19	11 45	9576	− 4.0	+22.0	---	401
20	11 45	9576	+10.0	+22.5	---	324
21	11 45	9576	+23.0	+22.5	---	309
22	11 46	9576	+36.5	+22.5	---	278
23	11 45	9576–77	+53.0	+22.5	---	309
24	11 48	9576–77	+66.5	+22.5	---	309

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1924	h m		°	°		
Oct. 25	11 45	9578	−23.0	+22.0	---	62
		9576	+78.0	+22.5	247	---
26	11 45	9579	−67.0	+21.5	62	---
		9578	−10.0	+21.5	---	108
29	11 52	9579	−29.0	+21.0	31	---
		9578	+29.0	+21.5	---	108
Nov. 1	11 45	9578	+68.0	+21.5	---	77
2[2]	11 45	----	----	----	---	---
3[2]	11 45	----	----	----	---	---
4[2]	11 44	----	----	----	---	---
5[2]	11 45	----	----	----	---	---
6[2]	11 46	----	----	----	---	---
7[2]	11 45	----	----	----	---	---
8[2]	11 41	----	----	----	---	---
12	11 44	9581	−39.5	+21.5	---	31
13	11 45	9581	−29.5	+21.0	---	46
14	11 45	9581	−15.5	+21.0	---	46
16	11 45	9584	−64.5	+18.0	---	432
		9583	+ 4.0	+27.5	---	93
17	11 47	9584	−51.0	+18.0	---	401
		9583	+18.0	+28.5	---	123
19	11 45	9585	−63.0	+23.5	---	617
		9584	−24.0	+18.0	---	340
		9583	+39.5	+29.0	46	---
20	11 48	9585	−50.0	+24.0	---	586
		9584	−12.0	+18.5	---	370
21	11 45	952d	−67.5	−22.5	15	---
		9585	−36.5	+24.0	---	525
		9584	− 0.5	+18.5	---	617
24	11 46	952d	−28.5	−22.5	8	---
		9585	+ 1.5	+24.5	---	448
		9584	+39.0	+19.0	---	617
25	11 55	9585	+14.0	+25.0	---	340
		9584	+51.5	+19.0	---	741
26	11 46	9585	+26.0	+24.0	---	309
		9584	+65.0	+19.0	---	741
27	11 46	9585	+39.0	+24.0	---	309
28	11 45	9585	+52.5	+23.5	---	247
Dec. 2[2]	11 49	----	----	----	---	---
7	12 14	9588	−70.5	+20.5	93	---

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1924	h m		°	°		
Dec. 9	11 45	9589	−57. 5	+27. 5	---	31
		9588	−42. 5	+20. 5	---	93
11	11 45	9589	−30. 5	+27. 5	---	108
		9588	−15. 5	+21. 5	---	77
12	11 45	9590	−80. 0	+21. 5	---	201
		9589	−17. 5	+27. 5	---	62
		9588	− 1. 5	+21. 0	---	46
13	11 46	9590	−66. 0	+21. 5	---	185
		9589	− 4. 5	+28. 0	---	77
		9588	+11. 5	+21. 5	31	---
14	11 46	9590	−53. 5	+21. 5	---	185
		9588	+25. 5	+21. 0	31	---
15	11 59	9590	−38. 5	+21. 5	---	154
		9588	+39. 5	+21. 5	15	---
18	11 46	9592	−10. 0	+15. 5	---	62
		9590	− 3. 0	+21. 0	62	---
			+ 6. 0	+22. 5	31	---
19	11 46	9591	+ 0. 5	+18. 5	---	31
		9590	+10. 5	+21. 5	---	77
			+20. 0	+22. 5	31	---
20	12 1	9591	+13. 5	+19. 0	---	23
		9592	+19. 0	+14. 0	---	15
		9590	+23. 5	+22. 5	---	93
			+33. 0	+22. 5	23	---
21	11 51	9594	+13. 5	−23. 5	---	278
		9592	+31. 0	+14. 0	---	31
		9590	+35. 5	+22. 0	69	---
			+45. 0	+23. 0	---	23
25	12 14	9594	+66. 5	−24. 0	---	370
26	11 47	9594	+78. 0	−24. 0	---	154
28[2]	11 47	----	----	----	---	---
29[2]	11 40	----	----	----	---	---
1925						
Jan. 4	11 59	9596	−42. 0	−16. 5	15	---
5[2]	11 49	----	----	----	---	---
6[2]	11 47	----	----	----	---	---
7[2]	11 47	----	----	----	---	---
13	11 57	----	+44. 0	+12. 0	15	---
14[2]	11 28	----	----	----	---	---
15[2]	13 13	----	----	----	---	---
20	13 17	9598	+25. 5	+24. 5	---	139
21	10 44	9598	+36. 5	+24. 5	---	139

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1925	h m		°	°		
Jan. 22	11 51	9598	+51. 0	+24. 0	---	108
23	11 52	9598	+63. 5	+24. 5	---	62
24	11 41	----	+76. 0	+16. 5	77	---
25[2]	14 4	----	----	----	---	---
28[2]	11 47	----	----	----	---	---
30[2]	11 53	----	----	----	---	---
31	12 0	9601	−71. 0	+23. 5	54	---
Feb. 3[2]	11 51	----	----	----	---	---
4	11 51	9605	+26. 0	+25. 5	---	77
		9603	+50. 0	+26. 0	---	31
5	11 57	9605	+39. 0	+25. 5	---	69
6	11 51	9605	+55. 5	+25. 5	---	54
7	11 52	9607	−79. 0	−18. 0	401	---
		9606	−13. 0	+ 9. 5	---	77
8	11 53	9607	−66. 0	−18. 5	370	---
		9606	0. 0	+10. 0	---	139
9	11 56	9607	−53. 0	−18. 0	401	---
		9606	+15. 5	+ 9. 5	---	185
12	11 54	9607	−13. 5	−18. 5	401	---
		9611	−13. 0	−30. 0	---	39
		9606	+56. 0	+10. 0	---	216
14	11 50	9607	+12. 5	−19. 0	---	340
		9611	+12. 5	−30. 0	---	139
18	12 0	9612	+ 5. 0	−21. 5	---	31
		9607	+66. 5	−18. 5	---	185
19	12 10	9612	+18. 5	−21. 5	---	139
		9607	+79. 5	−19. 0	---	93
20	11 54	9612	+31. 5	−22. 0	---	93
21	11 50	9612	+43. 5	−21. 5	---	62
22	11 46	955e	+26. 0	+24. 5	---	62
		9612	+56. 0	−21. 0	---	23
24[2]	12 38	----	----	----	---	---
26[2]	11 52	----	----	----	---	---
27[2]	11 50	----	----	----	---	---
28	11 52	9614	+ 7. 0	−25. 0	---	46
Mar. 2	11 54	9614	+33. 5	−25. 0	---	46
3[2]	11 54	----	----	----	---	---
4[2]	12 10	----	----	----	---	---

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1925	h m		°	°		
Mar. 6 [2]	11 58	----	----	----	---	---
7 [2]	11 54	----	----	----	---	---
8 [2]	11 58	----	----	----	---	---
9 [2]	11 56	----	----	----	---	---
10 [2]	12 11	----	----	----	---	---
11	12 6	9615	−73. 5	−19. 5	---	139
12	11 55	9615	−59. 5	−19. 5	---	247
15	11 55	9615	−17. 5	−20. 5	---	278
16	12 2	9615	− 2. 0	−20. 5	---	324
19	11 53	9615	+38. 5	−21. 5	---	123
20	11 52	9615	+49. 5	−21. 0	---	216
21	11 49	9615	+63. 0	−21. 5	123	---
22	11 53	9615	+75. 5	−21. 5	108	---
		9617	+79. 0	−29. 0	62	---
23	11 53	9619	−48. 5	+23. 5	---	46
24	11 49	9619	−32. 5	+21. 0	---	15
		9618	−23. 5	+20. 5	---	31
25	11 49	9619	−19. 5	+20. 5	23	---
		9618	− 9. 0	+20. 5	---	93
26	11 50	9619	− 6. 5	+20. 5	15	---
		9618	+ 4. 5	+21. 0	---	278
		956c	+78. 5	+25. 0	154	---
28	11 49	9619	+18. 0	+21. 0	8	---
		9618	+34. 5	+21. 5	---	278
29	11 58	9618	+46. 0	+21. 5	---	432
Apr. 2	12 4	9620	−75. 0	−32. 5	77	---
3	11 53	9620	−62. 0	−32. 0	77	---
4	11 49	9621	−65. 0	+16. 0	31	---
		9620	−49. 0	−31. 5	46	---
5	11 50	9621	−50. 5	+16. 5	---	39
		9620	−36. 0	−31. 0	23	---
6	11 52	9621	−37. 0	+16. 0	---	46
		9620	−22. 5	−31. 5	15	---
7	11 49	9623	−77. 0	−22. 5	77	---
		9622	−65. 0	+31. 0	62	---
		9621	−23. 5	+16. 5	---	46
8	11 48	9623	−63. 5	−22. 0	62	---
		9622	−51. 0	+30. 5	77	---
1925	h m		°	°		
Apr. 9	11 47	9623	−49. 5	−21. 5	31	---
		9622	−39. 0	+31. 0	46	---
11	11 55	9627	−39. 5	+20. 5	108	---
		9623	−22. 5	−22. 0	23	---
		9622	−14. 0	+31. 0	23	---
		9625	− 4. 0	+23. 0	---	247
		9626	+41. 0	+12. 5	---	77
12	11 47	9627	−26. 5	+20. 5	77	---
		9622	− 1. 0	+30. 5	31	---
		9625	{+ 5. 5	+25. 0	---	62
			{+11. 5	+21. 0	---	247
		9626	+57. 0	+12. 0	46	---
13	11 50	9628	−60. 0	+18. 0	31	---
		9627	−13. 0	+20. 5	54	---
		9625	{+19. 0	+26. 0	---	15
			{+24. 0	+21. 5	---	278
15	11 43	9628	−34. 0	+17. 5	15	---
		9629	−17. 0	+21. 5	---	62
		9627	+12. 5	+20. 5	46	---
		9625	+49. 5	+21. 5	---	309
16	11 46	9628	−23. 0	+17. 5	---	108
		9629	− 1. 0	+22. 0	23	---
		9627	+26. 5	+20. 5	46	---
		9625	+62. 5	+21. 5	247	---
18	11 48	9631	−65. 0	−24. 5	---	386
		9630	−60. 0	+19. 5	---	46
19	11 45	9633	−68. 0	+17. 5	31	---
		9631	−50. 0	−25. 0	---	278
		9630	−47. 5	+19. 5	---	23
		9632	−22. 0	+21. 5	---	46
		9629	+37. 0	+22. 5	---	77
20	11 54	9633	−55. 0	+17. 0	15	---
		9631	−37. 0	−24. 5	---	185
		9630	−35. 0	+19. 5	15	---
		9632	− 9. 0	+22. 5	---	77
21	11 50	9633	−40. 5	+17. 0	31	---
		9631	−24. 0	−24. 5	---	77
		9634	−10. 0	+27. 0	31	---
22	11 52	9633	−27. 0	+17. 0	15	---
		9634	+ 1. 5	+27. 0	---	46
		9632	+15. 0	+21. 5	31	---
23	12 52	9633	−13. 5	+17. 5	15	---
		9634	+13. 5	+27. 5	---	170
24	11 46	9634	+26. 0	+27. 5	---	154
25	11 53	9634	+37. 5	+28. 0	---	262
26	12 22	9635	−14. 5	−17. 5	---	54
		9634	+49. 0	+28. 5	---	139
27	11 55	9635	− 1. 0	−17. 0	---	31
		9634	+64. 5	+28. 0	---	93

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1925	h m		°	°		
May 1	11 53	9637	−63. 0	+16. 5	---	309
2	11 59	9637	−49. 0	+16. 5	---	556
3	11 52	9637	−36. 0	+17. 0	---	494
5	12 6	9638	−45. 5	+21. 5	23	---
		9637	− 9. 0	+16. 5	---	494
6	11 55	9638	−31. 0	+21. 5	15	---
		9637	+ 4. 5	+16. 5	---	556
8	11 51	9637	+33. 0	+17. 0	---	556
9	11 48	9640	−61. 0	−19. 5	---	154
		9637	+47. 0	+17. 5	---	556
10	11 57	9637	+60. 5	+17. 5	216	---
13	12 2	9642	−61. 5	+18. 5	---	154
		9640	− 7. 5	−19. 5	---	77
15	11 50	9643	−43. 5	+26. 5	---	77
		9642	−35. 0	+19. 5	---	262
		9640	+21. 5	−19. 5	---	100
16	11 49	9643	−30. 0	+26. 5	---	62
		9642	−21. 5	+21. 0	---	139
		9645	+ 3. 5	+35. 0	---	62
		9640	+34. 0	−19. 0	---	108
17	11 43	9649	−60. 0	+22. 0	---	201
		9642	− 9. 0	+22. 5	---	278
		9645	+16. 0	+34. 5	---	216
		9640	+46. 5	−18. 5	---	154
19	11 46	9649	−40. 0	+22. 5	---	247
		9648	−24. 0	+20. 5	---	139
		9647	+ 4. 5	−20. 0	---	31
		9642	+21. 5	+20. 0	---	201
		9645	+42. 0	+35. 0	---	201
		9640	+75. 0	−18. 5	62	---
20	11 46	9651	−61. 5	−19. 5	---	31
		9649	−26. 5	+22. 5	---	185
		9648	−11. 5	+21. 5	---	154
		9647	+18. 5	−19. 5	---	31
		9643	+24. 0	+27. 0	---	31
		9642	+34. 0	+19. 5	---	139
		9645	+55. 0	+34. 5	---	278
21	11 47	9651	−48. 5	−19. 5	---	77
		9649	−14. 5	+22. 5	---	262
		9648	+ 3. 0	+21. 5	---	123
		9643	+37. 5	+26. 5	---	31
		9642	+50. 5	+19. 0	123	---
		9645	+68. 5	+34. 5	---	123
22	11 50	9651	−35. 0	−19. 5	---	62
		9649	− 1. 5	+23. 0	---	324
		9648	+16. 0	+21. 0	---	77
		9643	+50. 5	+25. 5	---	31
		9642	+64. 5	+19. 5	---	123
23	11 45	9648	+32. 0	+20. 5	---	46
		9649	+13. 5	+22. 5	---	370

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1925	h m		°	°		
May 24	11 47	9649	+28. 5	+22. 0	---	556
26	11 56	9649	+52. 0	+22. 5	---	370
27	12 6	9654	−79. 5	+12. 5	123	---
		9653	−11. 5	−19. 5	---	77
		9649	+65. 5	+24. 5	---	370
28	11 48	9654	−65. 5	+13. 5	154	---
		9653	+ 2. 5	−20. 0	---	108
		9649	+79. 5	+24. 5	---	340
29	11 53	9654	−52. 5	+13. 5	216	---
		9653	+16. 0	−20. 0	--	62
31	11 50	9656	−37. 5	+27. 5		31
		9654	−26. 0	+13. 5	201	---
		9653	+45. 5	−20. 0	15	---
June 1	11 15	9658	−74. 0	+31. 5	---	278
		9657	−70. 0	−25. 5	93	---
		9656	−26. 5	+28. 5	---	247
		9654	−11. 5	+14. 5	---	154
2	11 51	9658	−59. 5	+28. 5	---	62
		9657	−57. 5	−27. 5	123	---
		9656	−14. 0	+28. 0	---	525
		9654	+ 1. 0	+13. 5	---	154
		9653	+68. 5	−19. 5	---	309
3	11 55	9660	−72. 5	+22. 5	123	---
		9658	−47. 0	+29. 5	---	247
		9657	−44. 0	−27. 0	77	---
		9656	− 1. 5	+28. 5	---	586
		9654	+14. 0	+14. 0	93	---
		9653	+78. 0	−19. 5	93	---
4	11 26	9660	−58. 0	+22. 0	154	---
		9658	−35. 5	+27. 5	77	---
		9657	−32. 5	−28. 5	62	---
		9656	+11. 5	+28. 0	---	525
		9654	+27. 5	+14. 5	123	---
5	11 36	9660	−44. 5	+22. 0	185	---
		9657	−19. 0	−28. 0	77	---
		9656	+24. 5	+28. 5	---	556
		9654	+40. 5	+14. 5	62	---
8	11 25	9666–68	−66. 5	+15. 5	---	185
		9665	−21. 5	+19. 0	---	185
		9660	− 5. 5	+20. 0	--	154
		9658	+18. 0	+30. 0	--	123
		9667	+18. 5	−13. 0	--	154
		9657	+19. 0	−28. 0	62	---
		9656	+64. 5	+27. 5	185	---
9	11 52	9666–68	−51. 5	+19. 0	---	278
		9665	− 7. 5	+20. 0	---	247
		9660	+ 8. 5	+20. 5	---	154
		9658	+31. 5	+28. 5	---	185
		9667	+32. 5	−13. 5	---	216
		9657	+32. 5	−29. 0	31	---
		9656	+78. 0	+27. 0	77	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1925	h m		°	°		
June 10	11 22	9666–68	−38.0	+19.5	---	247
		9663	+2.5	+22.0	123	---
		9665	+10.0	+19.5	77	---
		9660	+20.5	+20.5	139	---
		9658	+44.0	+29.5	---	309
		9667	+45.0	−14.0	---	278
		9657	+45.0	−28.5	---	77
11	11 23	9666–68	−25.0	+19.0	---	370
		9663	+15.5	+21.0	108	---
		9665	+23.5	+19.0	77	---
		9660	+34.5	+20.5	139	---
		9658	+57.0	+30.5	---	262
		9667	+58.5	−14.5	---	340
		9657	+58.5	−29.0	31	---
12	11 21	9668	−19.5	+20.5	---	108
			−11.5	+18.5	---	93
		9666	−3.0	+18.5	---	93
		9663	+28.5	+21.5	123	---
		9665	+38.0	+19.0	77	---
		9660	+47.0	+20.5	139	---
		9658	+69.0	+30.5	---	185
		9667	+71.5	−13.0	---	370
15	11 19	9666	+39.5	+18.5	108	---
		9663	+67.5	+22.5	93	---
17	11 21	9666	+65.0	+18.5	93	---
19[2]	12 7	----	----	----	---	---
20[2]	11 22	----	----	----	---	---
22[2]	11 26	----	----	----	---	---
24	11 46	9674	−83.5	−26.5	---	93
25	11 27	9674	−59.5	−26.5	---	123
26	11 26	9674	−47.5	−27.0	---	93
27	11 20	9674	−30.5	−27.5	31	---
29	11 35	9675	−55.0	−12.5	154	---
30	11 46	9675	−41.0	−13.0	123	---
		9674	+3.5	−27.5	---	62
July 1	11 46	9676	−60.0	−35.0	31	---
		9675	−28.0	−13.0	123	---
		9674	+15.5	−27.5	---	15
2	11 46	9677	−67.0	−17.5	---	216
		9676	−47.5	−36.5	---	139
		9675	−15.0	−13.0	93	---
3	11 51	9677	−54.5	−17.5	---	340
		9676	−34.5	−36.5	---	77
		9675	−1.5	−12.5	139	---
4	11 50	9677	−41.0	−17.0	---	278
		9676	−21.0	−36.0	---	62
		9675	+11.5	−12.5	123	---
		9678	+39.0	−30.0	---	123

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1925	h m		°	°		
July 5	11 47	9677	−28.5	−16.5	---	432
		9676	−8.5	−35.5	15	---
		9675	+25.0	−12.5	123	---
		9678	+54.0	−30.0	---	62
6	11 46	9677	−14.0	−16.5	---	432
		9675	+38.5	−12.5	139	---
		9678	+66.5	−29.5	62	---
7	11 46	9681	−35.0	−20.0	---	31
		9677	−2.0	−17.0	---	494
		9675	+51.5	−13.0	77	---
8	11 46	9677	+12.0	−17.0	---	432
		9675	+65.0	−13.5	123	---
10	11 47	9683–84	−80.0	+22.0	---	216
		9682	−51.0	+19.5	---	123
		9677	+39.5	−15.5	---	370
11	11 47	9683–84	−65.5	+22.0	---	154
		9682	−35.5	+19.5	---	108
		9677	+53.0	−16.0	---	309
12	11 52	9683–84	−50.0	+21.5	---	123
		9682	−18.5	+17.5	62	---
		9677	+67.5	−16.5	---	370
13	11 43	9683–84	−37.5	+21.0	---	93
		9682	−4.5	+17.5	46	---
		9677	+79.0	−17.0	---	370
14	11 51	9684	−30.0	+22.0	46	---
		9682	+9.5	+17.5	31	---
15	12 18	9684	−17.0	+21.5	---	31
		9682	+22.0	+17.0	31	---
16	11 55	9684	−3.0	+22.5	---	185
		9682	+35.5	+17.0	46	---
17	11 47	9687	−38.5	−18.0	---	62
		9684	+11.5	+22.5	---	123
		9682	+49.0	+17.5	31	---
		9685	+57.5	−21.0	---	154
18	11 54	9687	−24.5	−18.0	---	62
		9684	+25.5	+22.5	---	93
19	11 52	9687	−12.0	−18.5	---	62
		9688	0.0	+18.5	---	123
		9684	+38.5	+23.5	31	---
20	11 57	9687	−0.5	−18.5	15	---
		9688	+13.0	+18.5	---	62
		9689	+32.5	−25.5	---	31
		9684	+50.0	+24.0	15	---
23[2]	11 52	----	----	----	---	---
24	11 49	9692	−62.5	−31.5	---	184
		9691	−38.5	+21.5	---	155

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1925	h m		°	°		
July 25	11 44	9693	−66.0	−12.0	77	---
		9692	−49.0	−30.5	---	154
		9691	−24.0	+21.0	---	309
26	11 43	9693	−53.0	−12.0	62	---
		9692	−35.5	−31.0	---	62
		9691	−10.5	+20.5	---	185
27	11 57	9693	−40.0	−12.5	31	---
		9692	−22.0	−30.5	---	93
		9691	+ 3.0	+21.0	---	185
28	11 46	9693	−26.0	−12.5	15	---
		9692	− 8.5	−30.0	---	154
		9691	+15.0	+20.5	---	123
29	11 46	9693	−12.5	−11.5	15	---
		9692	+ 5.0	−29.5	---	154
		9691	+27.5	+20.0	---	123
30	11 46	9693	+ 0.5	−11.0	15	---
		9692	+18.5	−29.5	---	108
		9691	+40.0	+21.0	---	108
Aug. 1	11 45	9692	+45.0	−30.0	---	216
		9691	+73.5	+19.5	123	---
3	12 52	9692	+72.0	−29.5	---	62
6	12 11	9697	+28.0	−29.5	---	77
7	11 49		−50.0	+20.0	---	46
		9698	− 3.0	+23.5	---	77
		9697	+41.0	−29.0	---	185
8	11 49	9701	−77.5	+22.0	---	77
		9700	−47.0	+21.5	---	77
		9698	+10.0	+23.5	---	123
		9697	+54.5	−28.5	---	108
9	11 44	9701	−64.0	+22.0	---	77
		9700	−34.0	+21.5	---	139
		9698	+24.0	+23.0	---	340
		9697	+69.5	−28.5	62	---
10	11 46	9701	−55.5	+22.5	---	93
		9700–03	−20.0	+21.5	---	93
		9698	+37.5	+22.5	---	401
13	11 56	9699	+53.0	−28.5	---	77
		9698	+76.5	+22.0	---	432
14	11 54	9699	+68.0	−28.5	---	77
		9698	+88.5	+22.0	340	---
15[2]	11 50	----	----	----	---	---
16[2]	11 49	----	----	----	---	---
21	12 26	9707	−79.5	−19.0	---	278
		9705	−49.0	−28.5	---	77
22	11 22	9707	−68.0	−19.0	---	324
		9705	−36.0	−27.5	77	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1925	h m		°	°		
Aug. 24	11 50	9708	−60.5	+24.0	---	185
		9710	−50.5	+20.5	31	---
		9707	−40.0	−19.0	---	201
		9705	−10.0	−28.0	46	---
25	11 33	9708	−44.5	+23.5	---	154
		9710	−38.0	+18.5	---	93
		9707	−24.5	−19.0	---	201
		9705	+ 3.0	−27.5	46	---
		9711	+63.5	+15.0	---	62
26	11 34	9708–10	−29.0	+22.0	---	278
		9707	−10.5	−19.0	---	201
		9705	+15.5	−28.0	15	---
		9711	+75.0	+15.5	---	62
27	11 37	9708–10	−14.5	+21.5	---	309
		9707	+ 3.0	−19.0	185	---
		9705	+28.5	−28.0	15	---
28	11 52	9713	−46.0	+22.0	---	23
		9708–10	− 1.5	+21.0	---	401
		9707	+16.5	−18.5	---	185
		9705	+41.5	−27.5	15	---
29	11 37	9715	−85.0	+23.5	---	154
		9713	−33.5	+22.5	---	139
		9708–10	+13.0	+22.0	---	370
		9707	+29.5	−19.0	154	---
31	11 40	9715–17	−54.0	+22.5	---	154
		9713	− 6.0	+22.5	---	154
		9708–10	+39.0	+22.5	---	309
		9707	+57.5	−19.0	170	---
		9716	+75.0	+30.0	---	77
Sept. 1	11 40	9715–17	−42.0	+21.0	---	46
		9713	+ 7.0	+23.0	---	77
		9708	+55.5	+22.5	---	216
		9707	+70.0	−19.0	154	---
2	11 42	9721	−45.0	−19.5	23	---
		9715–17	−31.5	+20.5	46	---
		9713	+21.0	+20.5	31	---
		9708	+67.5	+21.5	201	---
3	11 27	9717	−19.0	+20.5	23	---
		9713	+35.0	+20.5	15	---
		9708	+81.5	+22.5	185	---
4	11 34	9726	−78.0	+21.0	---	62
		9725	−62.0	+17.5	---	23
		9721	−18.5	−19.0	---	31
		9723	− 6.5	+14.5	---	46
		9717	− 5.5	+20.5	31	---
		9722	+57.0	−24.5	---	100
5	11 42	9726	−63.0	+20.5	31	---
		9721	− 5.5	−19.0	15	---
		9717	+ 6.5	+21.5	15	---
		9723	+ 6.5	+14.5	---	31
		9722	+69.5	−25.0	62	---
9	12 14	9728	+22.5	+19.5	---	309
		9729	+59.0	+24.0	23	---

[2] No spots.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1925	h m		°	°		
Sept. 10	11 29	9728	+35.5	+19.0	---	432
11	11 49	9728	+49.0	+18.5	---	586
12	11 44	9728	+62.5	+18.0	---	586
14	11 30	9732	−32.5	+19.0	---	77
		9730	+55.0	+17.5	---	15
17	11 25	9736	−80.0	−18.0	216	---
		9734	−56.5	+29.5	---	154
		9732	+ 9.0	+19.5	---	62
18	11 54	9738	−79.5	+21.5	62	---
		9736	−67.5	−18.5	100	---
		9739	−66.0	−34.5	77	---
		9735	−55.5	+31.0	---	62
		9734	−41.5	+29.5	---	77
		9732	+23.5	+18.5	39	---
19	11 42	9737–38	−62.0	+21.5	---	93
		9739	−53.5	−34.5	123	---
		9736	−53.0	−17.5	123	---
		9735	−44.0	+31.0	---	77
		9734	−30.0	+29.0	62	---
		9740	+34.0	−17.5	---	23
		9732	+35.5	+18.5	31	---
21	11 37	9737–38	−40.0	+20.0	---	154
		9739	−29.5	−34.5	154	---
		9736	−23.0	−18.0	---	108
		9735	−18.0	+30.0	15	---
		9734	− 4.0	+29.0	39	---
		9732	+61.0	+19.0	31	---
25	11 46	9745	−44.0	+11.5	---	139
		9743	+ 7.5	+21.0	---	100
		9739	+20.5	−34.0	139	---
		9741	+33.5	−15.0	---	309
26	11 43	9745	−31.0	+12.0	---	247
		9743	+19.5	+21.5	---	108
		9739	+33.0	−33.5	185	---
		9741	+46.0	−15.0	---	556
28	11 24	9748	−78.0	+17.5	93	---
		9747	−59.5	−19.5	---	77
		9745	− 4.0	+11.5	---	309
		9743	+45.5	+19.5	---	370
		9739	+59.5	−35.0	108	---
		9736	+72.5	−17.5	---	370
Oct. 3	11 48	9750	−48.5	+17.0	46	---
		9748	− 9.5	+17.0	---	100
		9747	+ 7.0	−20.5	---	370
		9745	+66.5	+10.5	---	170
5	12 5	9750	−21.0	+15.0	46	---
		9748	+18.0	+15.5	69	---
		9747	+35.0	−20.0	---	309
6	11 44	9750–51	−11.5	+17.5	---	93
		9748	+30.5	+15.0	69	---
		9747	+48.0	−20.0	---	247

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1925	h m		°	°		
Oct. 7	11 50	9750–51	+ 2.5	+18.0	---	162
		9748	+44.0	+15.0	46	---
		9747	+61.5	−20.0	154	---
8	11 53	9750–51	+15.0	+17.5	---	77
		9748	+59.0	+15.5	46	---
10	12 2	9755	−65.0	−20.0	62	---
		9753	−40.5	−18.0	---	77
		9751	+39.0	+19.5	---	139
		9750	+45.0	+15.0	15	---
15	12 2	9759	−61.0	−17.5	---	926
		9758	−51.5	+17.5	---	432
		9761	−26.0	−14.5	---	54
		9753	+29.5	−17.0	---	77
		9757	+42.5	−23.0	---	185
19	11 35	9766	−44.5	−19.5	---	131
		9762–65	−38.0	+22.0	---	494
		9760	−12.0	−21.0	---	586
		9759	− 4.0	−15.5	139	---
		9758	+ 2.0	+18.0	---	278
		9761	+26.5	−14.5	---	201
			+33.5	−15.0	247	---
20	11 48	9769	−79.5	−23.5	154	---
		9767	−39.0	+19.5	---	77
		9766	−30.5	−18.5	---	185
		9762–65	−24.5	+22.0	---	432
		9760	+ 1.5	−20.5	---	556
		9759	+10.0	−15.0	201	---
		9758	+15.5	+17.5	---	108
		9761	+39.5	−15.0	---	247
			+49.5	−15.5	247	---
21	11 52	9769	−61.5	−24.5	185	---
		9767	−26.0	+19.0	---	85
		9766	−18.5	−19.5	---	131
		9762–65	−11.0	+21.5	---	494
		9760	+14.5	−21.0	---	556
		9759	+22.5	−15.0	154	---
		9758	+28.5	+17.0	---	39
		9761	+51.5	−14.5	139	---
			+63.5	−15.0	123	---
23	11 43	9769	−35.5	−24.0	77	---
		9767	0.0	+19.0	---	77
		9766	+ 8.5	−19.5	---	123
		9762	+15.0	+21.5	---	401
		9760	+43.0	−21.5	---	556
		9759	+50.0	−15.5	123	---
		9758	+54.5	+16.0	---	185
		9761	+80.0	−15.0	46	---
26	12 47	9771	+13.0	+16.5	15	---
		9767	+44.0	+17.5	23	---
		9765	+49.0	+23.5	69	---
		9766	+49.5	−18.5	62	---
		9762	+58.0	+21.0	---	77
28	11 45	9772	−87.0	+12.5	139	---
		9771	+40.0	+15.5	---	185
		9765	+75.0	+22.5	154	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1925	h m		°	°		
Oct. 28	11 45	9766	+78.0	−19.0	85	---
		9765	+80.0	+26.0	123	---
		9762	+83.0	+20.5	154	---
29	11 42	9772	−69.5	+11.5	---	69
		9771	+57.0	+15.0	77	---
31	11 46	9772	−42.5	+12.5	---	154
		9773	−39.5	−25.0	15	---
Nov. 3	11 46	9772	− 2.5	+12.5	---	123
6	11 42	9778	−63.5	−16.5	77	---
9	11 45	9781	−65.5	−22.0	---	62
		9779	−52.0	−16.5	---	494
10	11 43	9781	−53.0	−22.5	---	54
		9779	−38.0	−16.0	---	864
11	11 43	9781	−39.0	−21.5	---	93
		9779	−25.0	−16.5	---	1080
14	11 43	9779	+13.5	−16.0	---	772
17	11 40	9788	−80.5	+17.5	77	---
		9787	−55.5	−23.0	154	---
		9779	+54.5	−15.0	---	340
18	11 45	9790	−72.0	+18.0	---	648
		9787	−41.0	−22.0	162	---
		9789	+63.5	+11.0	---	93
		9779	+67.5	−16.0	---	247
20	11 42	9792	−69.5	−31.0	69	---
		9790	−48.5	+19.0	---	1173
		9787	−14.0	−22.0	139	---
		9791	+ 7.5	+22.5	---	93
21	11 36	9794–96	−78.0	+21.5	154	---
		9792	−55.5	−31.5	69	---
		9790	−35.0	+18.5	---	1235
		9787	− 1.0	−22.0	139	---
		9791	+20.5	+22.0	---	309
23	11 44	9794–96	−54.5	+21.5	---	309
		9792	−30.0	−31.0	31	---
		9790	−10.0	+18.0	---	1173
		9787	+25.0	−22.0	139	---
		9791	+46.5	+22.5	---	864
		9795	+59.0	+27.0	---	85
		965m	+66.0	+22.5	---	77
24	11 47	9794–96	−41.0	+21.5	---	648
		9792	−17.5	−31.0	46	---
		9790	+ 3.5	+18.0	---	1111
		9787	+39.0	−22.0	123	---
		9791	+59.5	+22.0	---	679
		9795	+73.0	+26.0	---	154
28	11 35	9797	−53.0	+21.5	---	77
		9794–96	+14.0	+21.0	---	463
			+45.0	+21.0	15	---
		9790	+60.0	+17.0	---	1543

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1925	h m		°	°		
Dec. 1	11 40	9801	−63.5	+26.5	62	---
		9799	−35.0	+20.5	---	185
		9797	−12.0	+21.0	---	93
		9800	+34.0	+15.0	---	108
		9796	+50.0	+21.5	---	247
		9794	+63.5	+22.0	216	---
7	11 39	9807	−53.0	−15.0	77	---
		9805	−35.0	−19.5	---	463
		9804	−17.5	+15.0	---	69
		9801	+14.0	+27.5	---	247
		9799	+45.5	+20.5	93	---
		9803	+47.0	−18.0	15	---
		9798	+63.0	+10.0	---	131
8	11 40	9807	−40.0	−15.0	46	---
		9805	−22.0	−20.0	---	710
		9804	− 4.0	+15.0	---	62
8	11 40	9801	+26.5	+27.5	---	247
		9799	+59.0	+20.0	116	---
10	11 30	9810	−72.5	+23.0	---	617
		9805	+ 5.0	−20.0	---	864
		9801	+52.5	+28.5	---	62
12	11 39	9813–14	−65.0	+25.0	---	309
		9812	−58.5	−15.5	---	309
		9810–11	−43.0	+24.0	---	1049
		9805	{+26.0	−22.0	---	309
			{+34.0	−19.5	---	370
14	12 55	9819	−87.0	+16.5	494	---
		9815	−55.0	−21.5	---	185
		9813–14	−37.0	+24.0	---	262
		9812	−30.5	−16.5	---	309
		9810–11	−17.0	+24.0	---	1420
		9805	{+52.5	−22.0	---	401
			{+62.5	−19.0	---	309
18	11 45	9822	−60.5	−11.5	93	---
		9821	−51.5	−17.5	---	139
		9819	−30.0	+17.5	---	463
		9820	−27.0	+26.0	---	139
		9815	+ 1.5	−21.0	---	185
		9814	+ 9.0	+23.0	54	---
		9812	+22.5	−15.5	---	69
		9810–11	+34.5	+24.0	---	1080
19	11 41	9824	−80.0	+15.5	139	---
		9825	−70.0	−19.0	---	185
		9823	−66.0	+22.0	31	---
		9822	−46.0	−11.5	85	---
		9821	−36.5	−17.5	---	77
		9819	−17.0	+17.0	---	494
		9820	−14.0	+26.0	---	309
		9815	+15.5	−20.0	---	216
		9814	+22.0	+24.0	---	123
		9812	+37.0	−14.5	---	85
		9810–11	+48.0	+23.5	---	926
23	11 42	9830	−66.5	+27.5	---	1852
		9824	−24.5	+15.5	147	---
		9825	−23.0	−20.5	---	895

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1925	h m		°	°		
Dec. 23	11 42	9822	+8.5	−11.5	77	---
		9821	+19.5	−18.0	31	---
		9819	+37.5	+16.5	370	---
		9820	+44.0	+24.5	309	---
		9818	+72.0	+26.0	62	---
		9815	+75.0	−18.0	123	---
28	11 42	9835	−41.5	+39.5	---	123
		9830	−1.5	+24.5	---	1914
		9833	+3.0	+11.5	---	139
		9824	+40.0	+16.0	185	---
		9825	+44.0	−20.5	---	1543
		9822	+72.5	−11.0	62	---
29	11 42	9835	−28.0	+40.0	---	77
		9830	+12.5	+26.0	---	2037
		9833	+16.5	+10.5	---	170
		9828	+46.5	+20.5	---	62
		9824	+54.5	+16.5	170	---
		9825	+57.5	−20.0	---	1759
31	11 41	9837	−66.0	+24.5	31	---
		9835	−7.0	+40.5	---	46
		9836	+30.0	+20.0	---	31
		9830	+40.0	+25.0	---	2469
		9833	+45.0	+11.0	---	247
		9825	+80.0	−20.0	617	---
		9824	+80.0	+17.5	185	---
1926						
Jan. 2	11 42	(3)	−40.0	−17.5	22	---
			−38.5	+24.5	---	31
			+57.5	+28.0	25	---
			+60.0	+26.0	---	123
			+68.0	+12.0	---	62
			+70.0	+25.0	---	1914
			+75.0	+11.5	---	93
6	13 8	(3)	−81.0	+21.5	154	---
			−67.0	+26.0	62	---
			+6.5	−19.0	---	154
			+10.5	−18.5	---	185
			+17.0	−19.0	---	123
7	11 28	(3)	−75.0	+25.0	432	---
			−67.5	+19.5	154	---
			−54.0	+23.0	31	---
			+19.0	−18.5	---	154
			+22.5	−18.0	---	185
			+30.5	−19.0	---	123
9	11 44	(3)	−64.5	−18.5	62	---
			−58.0	−15.5	62	---
			−48.0	+25.5	---	340
			−48.0	+18.0	43	---
			−41.0	+19.5	123	---
			−28.0	+22.0	---	154
			+47.5	−18.0	---	247
			+54.0	−12.0	31	---
			+60.0	−19.0	185	---
11	10 58	(3)	−77.5	+16.5	185	---
			−67.5	+20.0	31	---
			−38.5	−19.5	52	---
			−30.5	−15.0	62	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1926	h m		°	°		
Jan. 11	10 58		−23.0	+27.0	---	139
			−20.0	+18.0	---	154
			−15.0	+18.5	93	---
			−4.5	+22.5	---	93
			+75.0	−19.0	---	216
11	13 33	(3)	−77.5	+17.0	278	---
			−67.0	+20.0	31	---
			−38.0	−19.5	37	---
			−29.5	−15.0	62	---
			−22.0	+27.0	---	93
			−18.5	+18.0	---	123
			−13.0	+18.5	93	---
			−3.5	+22.5	---	93
			+75.0	−19.0	---	216
13	11 52	(3)	−50.0	+16.5	216	---
			−40.5	+20.5	22	---
			−11.0	−19.0	31	---
			−4.0	−14.5	68	---
			+5.5	+26.0	---	93
			+7.0	+18.0	---	93
			+12.0	+18.5	40	---
			+22.0	+21.5	46	---
13	12 8	(3)	−49.5	+16.5	216	---
			−40.5	+20.5	25	---
			−10.5	−19.0	28	---
			−4.0	−15.0	62	---
			+6.0	+26.0	---	93
			+7.5	+18.0	---	93
			+12.0	+18.5	40	---
			+22.0	+21.5	46	---
14	10 55	(3)	−47.0	+23.0	9	---
			−37.0	+16.0	185	---
			−27.5	+20.0	12	---
			+1.5	−19.5	19	---
			+9.0	−15.0	43	---
			+17.0	+25.5	---	62
			+21.0	+17.5	---	154
			+34.0	+20.5	46	---
14	12 3	(3)	−45.5	+24.0	6	---
			−36.5	+16.5	216	---
			−27.0	+20.0	9	---
			+2.0	−19.0	15	---
			+9.5	−15.0	40	---
			+17.5	+25.5	---	93
			+22.0	+17.5	---	154
			+34.5	+20.5	43	---
14	13 4	(3)	−45.0	+24.0	9	---
			−35.0	+17.0	216	---
			−26.0	+20.5	9	---
			+2.0	−19.0	25	---
			+10.0	−15.0	56	---
			+18.5	+25.0	---	62
			+23.0	+17.5	---	154
			+36.0	+20.0	31	---
15	11 0	(3)	−86.0	−20.0	463	---
			−69.5	−10.0	31	---
			−22.5	+17.0	216	---

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1926	h m		°	°		
Jan. 15	11 0	(3)	−14.5	+20.0	15	---
			−7.0	−30.0	---	93
			+10.0	+23.0	31	---
			+15.0	−19.5	25	---
			+22.0	−15.0	40	---
			+30.5	+26.0	---	62
			+34.0	+17.0	---	123
			+49.0	+20.5	31	---
15	12 26	(3)	−86.0	−20.0	617	---
			−69.5	−10.5	31	---
			−22.5	+17.0	216	---
			−14.0	+20.0	9	---
			−6.5	−29.5	---	62
			+10.5	+23.0	15	---
			+15.0	−19.5	9	---
			+22.5	−15.0	31	---
			+31.0	+27.0	---	31
			+34.0	+17.5	---	93
			+49.5	+20.5	31	---
16	11 59	(3)	−73.0	−20.0	---	679
			−72.0	+17.5	123	---
			−67.5	−25.5	62	---
			−65.0	−32.5	---	31
			−21.5	+21.0	---	31
			−10.0	+17.0	154	---
			+6.0	−29.5	---	93
			+28.0	−19.5	15	---
			+36.0	−15.0	31	---
			+48.0	+17.0	---	62
			+60.5	+20.5	31	---
19	11 40	(3)	−77.0	+21.5	154	---
			−66.0	+22.5	---	1790
			−57.0	+21.0	---	648
			−57.0	−15.5	15	---
			−47.5	−8.5	---	123
			−35.5	−21.0	---	556
			−31.0	+17.0	62	---
			−27.5	−33.0	31	---
			+29.0	+17.5	154	---
20	11 39	(3)	−54.0	+22.5	---	2130
			−42.0	+20.5	---	401
			−43.0	−14.5	9	---
			−34.0	−8.5	---	154
			−21.5	−21.0	---	710
			−18.5	+17.0	62	---
			−14.5	−33.5	31	---
			+41.5	+17.5	123	---
22	13 38	(3)	−26.5	+22.5	---	2068
			−14.0	+20.5	---	370
			−7.5	−9.0	---	123
			+7.0	−20.5	---	741
			+9.0	+17.5	46	---
			+11.0	−34.0	31	---
			+68.0	+18.0	123	---
23	13 38	(3)	−29.5	+18.5	---	62
			−13.5	+23.0	---	1636
			−2.0	+21.0	401	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1926	h m		°	°		
Jan. 23	13 38	(3)	+18.0	−20.5	710	---
			+22.0	+17.5	31	---
			+24.5	−33.5	15	---
			+83.0	+18.0	123	---
26	12 8	(3)	−48.5	−18.0	154	---
			+26.0	+21.0	---	1574
			+37.0	+20.0	---	401
			+56.5	−22.5	741	---
27	12 34	(3)	−74.0	−19.0	62	---
			−34.5	−18.0	93	---
			+38.5	+21.0	---	1327
			+49.5	+20.0	---	401
			+55.0	+17.5	31	---
			+69.5	−22.0	---	586
28	11 30	(3)	−60.5	−19.5	62	---
			−20.5	−18.5	123	---
			+52.0	+21.5	---	1605
			+60.5	+20.5	---	494
			+81.0	−22.5	401	---
29	11 55	(3)	−47.5	−20.0	31	---
			−8.0	−18.0	---	93
			+64.0	+22.0	---	1481
			+75.0	+21.0	494	---
Feb. 5	12 1	(3)	+33.0	+22.5	62	---
			+42.0	−22.0	---	62
			+50.5	−18.5	---	62
			+58.5	−19.5	31	---
11	11 43	(3)	−82.0	−11.0	185	---
			−42.5	−18.0	---	648
			−35.0	−18.5	---	93
			−34.0	+16.0	---	216
			−27.0	−19.5	247	---
			−23.5	+20.0	154	---
			+25.0	+22.5	---	62
12	12 11	(3)	−87.0	−20.5	463	---
			−72.0	+18.0	---	154
			−67.0	−11.5	---	370
			−30.0	−18.0	---	648
			−23.0	+16.5	185	---
			−19.0	−19.0	---	185
			−17.5	+15.0	---	62
			−12.5	−19.5	340	---
			−10.5	+20.0	154	---
			+38.0	+22.5	---	93
16	11 44	(3)	−71.0	+17.0	---	154
			−57.0	+23.5	---	432
			−51.5	+17.5	---	31
			−49.5	+21.5	62	---
			−31.0	−20.5	340	---
			−17.0	+16.5	---	123
			−17.5	−11.5	247	---
			−8.0	−12.0	---	247
			+28.5	+18.0	---	123
			+30.5	−18.0	---	586
			+42.0	+21.0	93	---
			+73.0	+20.5	---	123

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1926	h m		°	°		
Feb. 17	11 44	(3)	−58.0	+17.0	---	154
			−47.0	+24.0	---	432
			−39.5	+17.5	9	---
			−35.0	+21.5	---	31
			−18.5	−20.5	370	---
			− 4.0	+16.5	93	---
			− 3.5	−11.0	247	---
			+ 6.0	−12.0	---	185
			+36.0	−18.0	278	---
			+42.0	+18.0	---	123
			+50.0	−19.5	---	278
			+55.5	+21.0	123	---
20	11 52	(3)	−16.0	+15.5	93	---
			− 6.0	+22.5	---	278
			+21.0	−19.5	370	---
			+37.5	−12.0	---	154
			+37.5	+17.5	31	---
			+47.5	−12.0	---	154
			+76.0	−18.0	---	216
23	11 57	(3)	+24.0	+16.0	62	---
			+30.5	+24.0	123	---
			+38.0	+12.5	---	123
			+60.0	−19.0	309	---
			+77.5	−10.5	62	---
24	11 44	(3)	+38.0	+16.0	---	62
			+43.5	+24.5	123	---
			+52.5	+13.0	---	216
			+74.0	−19.0	309	---
26	11 45	(3)	−79.0	−30.0	185	---
			−65.0	−27.0	---	833
			+65.0	+15.5	62	---
			+69.0	+24.0	---	93
			+77.0	+13.0	---	185
27	11 47	(3)	−62.5	−30.0	185	---
			−57.0	−19.0	---	154
			−52.0	−27.0	---	864
Mar. 2	11 38	(3)	−64.0	−17.0	---	93
			−26.0	−30.0	93	---
			−14.5	−27.5	---	1019
			+ 0.5	+29.0	---	62
			+ 7.5	+27.5	31	---
			+13.5	−19.0	---	93
3	12 10	(3)	−71.0	+21.0	---	154
			−50.0	−17.5	---	62
			−12.0	−30.0	93	---
			− 2.0	−27.5	---	1173
			+20.5	+28.0	62	---
			+26.0	−18.0	---	247
			+31.5	−20.0	---	216
4	11 40	(3)	−72.0	+22.0	154	---
			−66.0	+22.5	---	154
			−58.5	+21.0	93	---
			−40.5	−17.0	93	---
			−35.0	−17.5	---	62
			− 0.5	−30.0	93	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1926	h m		°	°		
Mar. 4	11 40	(3)	+10.0	−27.5	---	1235
			+38.0	−18.5	---	123
			+45.5	−20.5	185	---
5	11 47	(3)	−58.0	+21.5	154	---
			−52.0	+22.0	---	185
			−45.0	+20.5	62	---
			−27.5	−17.5	---	154
			−22.0	−17.0	---	123
			+21.0	−27.5	---	926
			+51.0	−19.0	---	154
			+58.0	−20.0	185	---
6	11 45	(3)	−79.5	−12.5	93	---
			−46.0	+21.5	154	---
			−45.0	+20.5	---	31
			−35.5	+21.5	---	278
			−13.5	−17.5	---	123
			− 8.0	−17.0	---	93
			+34.0	−27.5	---	895
			+62.5	−18.0	123	---
			+71.0	−20.0	185	---
8	11 44	(3)	−52.5	−12.5	---	93
			−45.0	+12.5	---	62
			−19.5	+21.5	185	---
			−11.0	+22.0	---	93
			− 8.0	+21.0	---	62
			+16.0	−17.0	---	154
			+57.0	−27.5	---	833
			+69.5	−14.5	31	---
9	11 43	(3)	−39.5	−12.0	62	---
			− 7.5	+22.0	---	154
			− 1.0	+21.5	---	31
			+ 4.0	+22.0	---	31
			+32.0	−17.5	---	62
			+70.0	−27.5	---	679
10	11 44	(3)	−42.0	−18.0	---	31
			−26.0	−12.0	62	---
			+ 7.0	+22.0	---	123
			+ 7.5	+17.5	---	31
			+11.0	+21.5	---	31
			+17.5	+22.5	---	93
			+80.0	−27.5	---	494
12	11 41	(3)	−77.0	−19.0	309	---
			−14.0	−17.0	---	185
			− 2.0	−18.0	---	62
			+ 1.0	−11.5	31	---
			+32.5	+21.5	62	---
			+37.0	+18.5	31	---
16	11 56	(3)	−38.0	+15.0	---	31
			−29.5	+10.5	31	---
			−23.0	−18.5	247	---
			− 7.5	+25.5	62	---
			− 1.0	+30.0	---	31
			+ 7.0	+28.0	---	62
			+12.0	−17.5	---	62
			+43.0	−16.0	---	340
			+68.0	+25.5	---	123

[3] Greenwich publication has not been received.

1757—29——33

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1926	h m		°	°		
Mar. 17	11 43	(3)	−26. 5	+15. 0	---	62
			−17. 5	+10. 0	31	---
			−11. 0	−19. 0	247	---
			+ 5. 0	+25. 0	31	---
			+11. 0	+30. 0	---	62
			+16. 5	+29. 0	31	---
			+19. 5	+28. 5	62	---
			+52. 5	−15. 5	154	---
			+58. 0	−16. 0	185	---
19	11 43	(3)	−37. 5	−22. 0	31	---
			− 1. 5	+14. 0	---	62
			+15. 0	−19. 5	309	---
			+32. 0	+24. 5	31	---
			+37. 5	+30. 0	---	62
			+47. 5	+28. 0	93	---
			+83. 0	−16. 0	---	370
22	11 44	(3)	−84. 0	−19. 0	154	---
			+ 4. 5	+10. 0	31	---
			+53. 5	−19. 5	---	278
23	12 0	(3)	−68. 5	−19. 5	---	62
			+ 5. 5	+21. 0	31	---
			+20. 0	+11. 0	---	62
			+68. 0	−19. 5	247	---
24	11 44	(3)	−68. 0	+27. 5	---	278
			−55. 0	−20. 0	---	62
			+19. 5	+21. 5	31	---
			+81. 0	−19. 5	309	---
25	11 43	(3)	−57. 0	+27. 5	---	401
			−42. 0	−20. 5	---	31
			+ 7. 5	−24. 0	---	62
			+32. 0	+21. 5	31	---
27	11 46	(3)	−47. 5	−25. 0	31	---
			−35. 0	+27. 5	---	185
			−26. 0	+25. 5	154	---
			+34. 0	−24. 0	---	154
29	11 45	(3)	− 9. 5	+29. 0	---	93
			+ 1. 0	+25. 5	154	---
			+60. 0	−23. 0	---	247
30	11 45	(3)	−72. 0	− 9. 5	93	---
			+ 4. 0	+28. 0	---	154
			+14. 5	+25. 5	93	---
			+18. 0	−18. 0	31	---
			+74. 0	−22. 5	---	154
Apr. 1	11 42	(3)	−44. 0	− 9. 5	62	---
			+28. 5	+29. 0	---	154
			+34. 5	+26. 0	31	---
			+40. 0	+26. 5	123	---
2	11 47	(3)	−30. 5	− 8. 5	62	---
			+40. 5	+29. 5	---	123
			+45. 0	+27. 5	---	93
			+52. 0	+26. 0	62	---
3	11 55	(3)	−17. 5	− 8. 5	62	---
			+19. 5	+10. 5	31	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1926	h m		°	°		
Apr. 3	11 55	(3)	+52. 5	+29. 0	---	123
			+64. 0	+26. 5	62	---
5	11 48	(3)	+ 9. 5	− 8. 5	62	---
7	11 44	(3)	−61. 5	+13. 0	123	---
			+35. 5	− 8. 0	62	---
9	11 45	(3)	−73. 5	−18. 5	---	154
			−44. 0	−15. 0	---	62
			−34. 0	+12. 5	93	---
			+62. 5	− 8. 5	62	---
10	11 46	(3)	−58. 0	−18. 5	---	185
			−28. 5	−14. 5	31	---
			−20. 5	+12. 5	123	---
14	12 2	(3)	−48. 0	−29. 0	---	185
			− 8. 0	−19. 0	---	123
			+31. 5	+11. 5	93	---
			+57. 5	− 8. 5	---	62
16	11 47	(3)	−22. 5	−28. 0	---	216
			+ 1. 0	−18. 0	---	31
			+18. 5	+25. 0	---	123
			+19. 0	−18. 0	---	62
			+59. 5	+13. 0	93	---
17	11 45	(3)	− 9. 0	−29. 5	---	185
			+14. 0	−18. 0	---	93
			+29. 0	+25. 0	---	123
			+30. 5	−19. 5	---	62
			+33. 5	+24. 0	---	185
			+73. 0	+12. 0	123	---
19	11 44	(3)	+17. 5	−29. 5	---	154
			+24. 0	−27. 0	31	---
			+27. 5	−24. 0	---	62
			+31. 0	+29. 0	---	62
			+36. 0	+29. 0	---	123
			+39. 0	−19. 0	62	---
			+60. 0	+25. 5	154	---
20	12 1	(3)	+31. 0	−29. 5	---	93
			+35. 0	−26. 0	---	31
			+40. 5	−24. 0	---	62
			+44. 0	+29. 0	---	62
			+51. 5	+29. 0	---	154
			+64. 0	+25. 5	62	---
			+77. 0	+25. 0	123	---
21	11 51	(3)	+44. 5	−29. 5	---	62
			+47. 0	−26. 5	---	93
			+54. 0	−24. 5	---	93
			+58. 0	+28. 5	---	123
			+65. 0	+29. 0	154	---
22	11 51	(3)	+60. 0	−26. 5	---	62
			+65. 5	−23. 5	---	154
			+68. 0	+29. 5	123	---
24	12 46	(3)	−63. 5	−15. 5	31	---
26	11 50	(3)	+27. 0	+20. 5	---	62

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1926	h m		°	°		
Apr. 27	11 49	[3]	+39. 0	+21. 5	---	62
			+45. 0	+26. 0	31	---
29	11 50	[3]	−79. 5	−19. 0	278	---
			−64. 0	+ 9. 5	---	216
			−58. 0	+ 9. 0	247	---
May 1	11 50	[3]	−65. 0	−20. 0	---	309
			−52. 0	−19. 0	---	340
			−37. 0	+ 9. 0	---	123
			−30. 0	+ 7. 5	---	154
4	11 46	[3]	−24. 5	−20. 0	---	216
			−24. 0	−22. 0	---	123
			−17. 5	−20. 5	---	93
			−12. 0	+21. 0	---	62
			−10. 0	−19. 0	---	340
			+11. 5	+ 7. 5	123	---
			+36. 5	+15. 0	---	216
5	11 45	[3]	−12. 5	−20. 5	---	185
			− 5. 5	−21. 0	---	123
			+ 2. 0	+21. 0	---	62
			+ 2. 5	−19. 5	---	370
			+24. 0	+ 7. 5	123	---
			+48. 0	+15. 0	---	216
6	11 44	[3]	+ 0. 5	−20. 5	---	154
			+10. 0	−20. 5	31	---
			+17. 5	−19. 0	---	463
			+17. 5	+21. 0	31	---
			+38. 0	+ 7. 5	123	---
			+62. 5	+15. 5	---	154
7	11 46	[3]	−81. 0	−18. 5	---	432
			−18. 5	−17. 0	---	62
			+11. 5	−21. 0	---	123
			+27. 0	+21. 5	---	62
			+30. 0	−18. 0	---	340
			+50. 5	+ 8. 0	123	---
			+78. 0	+17. 5	---	123
8	11 47	[3]	−68. 0	−19. 0	---	401
			−30. 5	+21. 0	---	62
			− 3. 5	−16. 5	31	---
			+27. 0	−19. 5	---	93
			+41. 0	−18. 0	---	278
			+41. 5	+22. 0	---	93
			+65. 0	+19. 0	---	123
			+65. 5	+ 7. 5	93	---
9	11 46	[3]	−54. 5	−19. 5	---	586
			−27. 0	+19. 5	---	123
			−18. 5	+21. 5	---	62
			+38. 5	−20. 5	62	---
			+50. 5	+23. 0	31	---
			+55. 5	−18. 0	---	278
			+80. 0	+ 8. 0	123	---
			+80. 5	+18. 5	---	216
11	11 46	[3]	−27. 5	−20. 0	---	525
			− 1. 0	+20. 0	---	62
			+ 7. 5	+19. 0	---	93
			+39. 5	−17. 0	---	216
			+87. 0	−18. 5	309	---
1926	h m		°	°		
May 12	11 43	[3]	−14. 5	−20. 5	---	525
			− 8. 0	+22. 0	---	93
			+19. 5	+19. 0	---	93
			+53. 0	−17. 0	---	216
13	11 45	[3]	−65. 5	+21. 5	62	---
			− 2. 0	−20. 5	---	432
			+ 4. 0	+22. 0	---	123
			+31. 0	+19. 0	---	93
			+66. 0	−16. 5	---	216
14	11 49	[3]	−53. 0	+21. 0	---	62
			−36. 5	+21. 5	---	62
			−32. 0	+20. 5	---	62
			+12. 0	−20. 5	---	370
			+17. 0	+22. 0	---	93
			+46. 5	+18. 0	---	93
			+75. 0	−16. 0	93	---
15	11 40	[3]	−72. 0	−19. 0	123	---
			−41. 0	+20. 5	---	62
			−22. 0	+22. 0	62	---
			−17. 5	+10. 0	---	123
			+25. 5	−20. 5	---	463
			+30. 0	+22. 0	---	93
			+57. 5	+19. 0	---	216
17	11 46	[3]	−50. 0	−20. 5	---	31
			−47. 0	−18. 5	---	123
			−42. 0	−17. 5	123	---
			+11. 0	+ 9. 5	---	93
			+48. 5	−18. 0	---	62
			+53. 5	−19. 5	278	---
18	11 45	[3]	−73. 5	−18. 0	93	---
			−37. 5	−19. 0	---	309
			−30. 0	−17. 5	---	216
			+67. 0	−19. 5	340	---
19	11 45	[3]	−60. 0	−18. 5	93	---
			−15. 0	−17. 5	---	463
			+37. 0	+23. 0	31	---
			+57. 0	−22. 5	---	93
			+78. 0	−19. 0	309	---
20	12 26	[3]	−46. 0	−18. 0	62	---
			− 7. 0	−20. 0	---	154
			− 6. 0	+23. 0	---	93
			− 4. 5	−17. 0	---	309
			+42. 0	+22. 0	---	62
			+69. 0	−22. 5	---	123
21	11 45	[3]	−34. 5	−18. 0	31	---
			−17. 0	+14. 5	---	62
			+ 2. 0	−21. 0	---	154
			+ 7. 0	−17. 5	---	93
			+ 7. 5	+22. 5	---	154
			+12. 0	−17. 5	185	---
			+52. 5	+24. 0	31	---
			+57. 5	+21. 0	---	62
22	11 44	[3]	−22. 0	−18. 0	31	---
			+19. 0	−17. 5	---	62
			+22. 0	+22. 5	---	154
			+24. 5	−17. 0	---	247

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1926	h m		°	°		
May 23	11 53	(3)	+30. 5	+22. 0	---	31
			+37. 0	+23. 0	---	31
			+36. 0	−17. 5	---	93
			+38. 0	−18. 0	216	---
24	11 46	(3)	+41. 5	−19. 5	---	93
			+43. 5	+23. 0	31	---
			+47. 0	−18. 0	---	93
			+52. 0	−17. 5	---	247
25	11 45	(3)	+60. 5	−18. 0	---	62
			+66. 5	−18. 0	154	---
26	11 49	(3)	−80. 0	−18. 0	154	---
			−36. 0	+17. 5	---	31
			+82. 0	−18. 0	216	---
27	11 46	(3)	−67. 5	−19. 5	123	---
			−24. 0	+17. 5	---	62
29	11 45	(3)	−75. 0	−15. 5	---	370
			−60. 5	+22. 0	62	---
			−50. 5	−17. 5	---	93
			−48. 0	− 7. 5	93	---
			−40. 5	−19. 5	123	---
			+49. 0	+26. 0	---	62
30	11 45	(3)	−66. 5	−15. 5	---	62
			−62. 0	−15. 5	216	---
			−47. 0	+22. 0	---	62
			−34. 0	− 7. 5	123	---
			−28. 5	−19. 5	93	---
31	11 45	(3)	−53. 0	−16. 0	31	---
			−48. 0	−16. 5	---	185
			−37. 0	+22. 0	---	62
			−32. 0	+22. 0	---	93
			−20. 5	− 8. 0	93	---
			−16. 0	−19. 5	93	---
June 1	11 44	(3)	−78. 0	+18. 0	154	---
			−35. 0	−16. 5	---	154
			−20. 0	+22. 5	---	123
			− 7. 5	− 8. 5	123	---
			− 2. 5	−19. 5	93	---
2	11 45	(3)	−65. 5	+18. 0	123	---
			−30. 0	−18. 0	---	201
			−22. 0	−16. 0	154	---
			− 7. 5	+22. 5	---	154
			+ 7. 0	− 9. 0	123	---
			+11. 5	−19. 5	62	---
3	11 49	(3)	−79. 0	+ 9. 5	---	278
			−52. 0	+18. 0	139	---
			− 8. 0	−17. 0	123	---
			+ 5. 0	+23. 0	---	123
			+19. 5	− 9. 0	93	---
			+24. 5	−19. 5	---	108
7	11 47	(3)	−31. 5	−25. 0	---	77
			−28. 0	+ 8. 0	---	401
			+ 0. 5	+17. 5	123	---
			+44. 0	−17. 5	123	---
			+59. 0	+22. 0	---	216

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1926	h m		°	°		
June 8	11 45	(3)	−22. 0	−27. 0	---	62
			−16. 0	−25. 0	---	62
			−14. 0	+ 8. 0	---	432
			− 2. 0	+12. 0	---	62
			+ 2. 0	+26. 5	---	31
			+13. 5	+17. 5	123	---
			+36. 0	−18. 0	---	108
			+58. 0	−17. 0	108	---
			+78. 0	+22. 0	---	247
9	11 46	(3)	− 8. 0	−27. 0	---	15
			− 2. 0	−25. 0	---	62
			− 2. 0	+ 8. 0	---	463
			+12. 0	+12. 0	---	77
			+12. 5	+25. 5	---	77
			+26. 5	+17. 5	93	---
			+48. 0	−17. 5	---	216
			+71. 5	−16. 5	216	---
10	11 45	(3)	−38. 0	+17. 5	---	46
			+ 4. 5	−27. 0	---	46
			+12. 0	−14. 5	---	62
			+13. 0	+ 9. 5	---	432
			+14. 5	+27. 5	---	46
			+15. 0	+12. 5	---	46
			+39. 5	+18. 0	108	---
			+62. 5	−17. 5	---	278
			+90. 0	−15. 0	309	---
11	11 45	(3)	−68. 0	−13. 5	---	154
			−24. 0	+17. 5	---	93
			+22. 0	−25. 0	---	123
			+25. 5	+ 9. 5	---	355
			+38. 0	+28. 0	---	31
			+41. 0	+12. 0	15	---
			+53. 0	+18. 0	123	---
13	11 42	(3)	−47. 0	−13. 5	---	154
			+45. 0	−17. 0	---	123
			+48. 0	+ 8. 0	---	340
			+57. 0	+ 9. 5	---	154
			+67. 0	+20. 5	---	154
			+85. 0	+17. 5	93	---
14	11 45	(3)	−60. 5	−14. 0	---	216
			−33. 0	−12. 5	---	170
			+52. 0	−28. 0	---	93
			+61. 0	−14. 5	31	---
			+64. 5	+ 7. 5	---	586
18	12 38	(3)	−45. 0	+26. 5	---	309
			− 4. 5	−12. 5	15	---
			+ 3. 0	− 7. 0	---	46
20	11 43	(3)	−62. 5	−28. 0	---	123
			−19. 0	+26. 0	---	679
			+18. 0	−14. 5	---	77
21	12 45	(3)	−49. 5	−28. 0	---	77
			− 7. 0	+25. 5	---	401
22	11 41	(3)	−87. 0	+22. 0	309	---
			−38. 0	−28. 0	46	---
			+ 5. 5	+27. 0	---	432

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1926	h m		°	°		
June 24	11 43	[3]	−74. 0	+22. 0	---	417
			−58. 5	+21. 5	525	---
			−11. 5	−29. 5	46	---
			+33. 0	+25. 5	---	370
			+67. 5	−14. 5	---	93
25	11 44	[3]	−59. 0	+22. 0	---	401
			−47. 5	+21. 5	525	---
			+ 1. 5	−29. 0	46	---
			+47. 5	+25. 5	278	---
27	11 49	[3]	−68. 0	+ 7. 5	123	---
			−46. 5	−17. 0	---	62
			−36. 5	+22. 5	---	324
			−23. 0	+22. 0	---	617
			+14. 0	+ 8. 5	---	93
			+26. 5	−28. 5	46	---
			+75. 0	+24. 0	---	185
28	11 46	[3]	−55. 0	+ 7. 5	77	---
			−33. 0	−17. 0	---	123
			−23. 0	+22. 5	---	324
			− 9. 5	+22. 0	---	494
			+29. 0	+ 8. 5	---	93
29	11 48	[3]	−78. 0	+20. 5	123	---
			−72. 0	+15. 0	31	---
			−42. 0	+ 8. 0	---	108
			−18. 5	−18. 0	---	46
			−10. 0	+22. 5	---	340
			+ 4. 5	+21. 5	---	370
			+42. 5	+ 8. 0	31	---
			+53. 0	+20. 0	---	93
30	11 44	[3]	−77. 5	+ 9. 0	62	---
			−64. 0	+20. 5	---	77
			−59. 5	+15. 0	31	---
			−42. 0	−13. 5	---	31
			−30. 0	+ 7. 5	---	62
			− 7. 5	−18. 0	---	46
			+ 3. 0	+23. 0	---	247
			+17. 5	+22. 0	---	401
			+55. 5	+ 8. 5	62	---
			+65. 0	+20. 5	---	463
July 1	11 45	[3]	−62. 0	+ 9. 0	---	93
			−50. 5	+20. 5	46	---
			−47. 0	+15. 5	15	---
			−15. 0	+ 7. 0	62	---
			+ 7. 0	−18. 5	---	154
			+16. 0	+22. 0	---	278
			+29. 5	+21. 0	---	401
			+78. 0	+20. 0	---	309
2	11 48	[3]	−48. 0	+ 9. 5	---	154
			−38. 0	+20. 0	31	---
			−34. 0	+15. 0	15	---
			− 1. 0	+ 7. 0	46	---
			+18. 0	−18. 0	---	62
			+28. 0	+22. 5	---	278
			+42. 0	+22. 0	---	309
6	11 42	[3]	− 4. 5	−16. 0	---	62
			− 3. 5	−25. 0	---	31
			+12. 5	−11. 0	---	93
			+80. 0	+23. 0	123	---
1926	h m		°	°		
July 7	11 44	[3]	+ 8. 0	−17. 5	---	31
			+11. 0	−15. 0	---	31
			+21. 0	−12. 0	---	31
			+29. 5	− 9. 5	---	15
10	11 45	[3]	−37. 0	−22. 0	---	62
			+48. 0	−12. 5	---	123
			+48. 0	−16. 5	---	46
11	11 44	[3]	−27. 0	−23. 5	---	31
			+64. 5	−22. 0	---	93
12	11 44	[3]	−10. 5	−22. 0	31	---
13	11 44	[3]	−27. 5	−13. 0	---	62
14	11 54	[3]	−13. 0	−12. 5	---	62
16 [2]	11 46	[3]	----	----	---	---
17 [2]	11 51	[3]	----	----	---	---
18 [2]	11 45	[3]	----	----	---	---
19	11 45	[3]	−62. 0	+18. 5	---	15
20	11 44	[3]	−83. 0	+21. 5	216	---
			−47. 5	+17. 5	31	---
21	11 45	[3]	−69. 5	+22. 0	216	---
			−35. 0	+17. 5	---	93
22	11 45	[3]	−58. 0	+22. 0	---	185
			−55. 0	+11. 0	---	62
			−22. 0	−18. 5	---	62
			−18. 5	+17. 5	---	46
23	11 45	[3]	−85. 0	−12. 0	463	---
			−45. 0	+22. 0	---	139
			− 8. 0	−18. 0	---	93
			− 9. 0	+18. 0	---	93
			+27. 0	− 9. 5	---	62
24	12 5	[3]	−70. 0	−12. 0	---	926
			−32. 0	+21. 0	---	77
			+ 4. 5	+17. 5	---	185
			+ 5. 5	−18. 5	---	216
25	11 46	[3]	−57. 0	−12. 0	---	988
			−19. 5	+21. 0	---	93
			+18. 0	+17. 5	---	185
			+15. 0	−20. 0	---	93
			+20. 5	−18. 5	---	154
26	11 55	[3]	−44. 0	−12. 0	---	1358
			−52. 0	+22. 0	---	93
			− 7. 0	+21. 5	77	---
			+31. 0	+17. 0	---	185
			+33. 0	−18. 5	---	401
27	11 52	[3]	−37. 5	+21. 5	---	62
			−35. 0	−13. 0	---	617
			−27. 0	−10. 0	---	556
			+ 7. 5	+21. 0	---	62
			+43. 0	+17. 0	---	247
			+45. 0	−18. 5	---	386

[2] No spots.

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1926	h m		°	°		
July 28	12 24	[3]	−25.0	+22.0	---	62
			−22.5	−13.0	---	494
			−12.5	−10.5	---	525
			+19.5	+20.5	---	46
			+57.0	−17.5	---	247
			+59.5	+16.0	---	278
30	12 5	[3]	−44.0	−22.0	---	185
			+ 4.0	−12.5	---	432
			+ 5.5	+21.0	15	---
			+15.5	−10.5	---	494
			+47.5	+21.0	---	62
Aug. 1	12 47	[3]	−44.0	+ 9.5	---	77
			−17.5	−22.5	---	108
			+32.0	+21.5	---	62
			+32.5	−12.0	---	247
			+42.5	−10.5	432	---
			+72.0	+20.5	31	---
2	12 18	[3]	−82.0	−18.5	---	679
			−28.0	+ 9.5	---	93
			+19.5	+24.5	---	62
			+43.0	−12.5	---	154
			+52.0	+21.0	---	62
			+57.5	−12.0	401	---
3	11 54	[3]	−67.5	−19.0	---	617
			−16.0	+ 9.5	---	93
			+28.0	+27.0	---	62
			+58.0	−12.0	---	340
			+65.0	+18.5	---	185
			+69.5	−12.0	370	---
4	11 46	[3]	−54.0	−18.5	---	556
			− 1.0	+10.0	---	108
			+69.0	−12.0	---	309
			+85.0	−11.0	---	525
			+85.0	+18.5	---	370
5	11 51	[3]	−37.0	−18.5	---	525
			+13.5	+ 9.5	---	123
6	12 7	[3]	−27.0	−19.5	---	525
			−18.0	−18.5	---	46
			+27.5	+ 9.0	---	77
7	11 47	[3]	−14.5	−20.5	---	432
			− 5.0	−19.0	---	31
9	11 47	[3]	−85.0	−18.0	617	---
			−35.0	−22.0	---	77
			+14.5	−20.5	---	309
10	11 51	[3]	−74.0	−18.5	---	772
			−22.5	−21.5	---	62
			+22.0	−19.0	---	123
			+31.0	−19.5	---	170
11	11 47	[3]	−58.5	−18.0	---	586
			− 7.5	−21.5	---	93
			+42.0	−19.5	---	401
1926	h m		°	°		
Aug. 12	11 45	[3]	−48.0	−18.5	---	617
			+ 4.5	−20.5	---	62
			+54.0	−18.5	---	370
13	11 41	[3]	−34.0	−18.0	---	586
			+20.0	−21.0	31	---
			+64.0	−19.0	---	309
14	11 42	[3]	−22.0	−18.0	---	463
			+30.5	−21.5	---	46
			+76.0	−19.5	123	---
16	11 43	[3]	0.0	−18.5	154	---
			+ 8.0	−19.0	278	---
26	11 45	[3]	−34.0	−21.0	---	93
			+ 5.0	−20.5	46	---
			+ 9.5	+19.5	---	31
			+19.5	− 9.5	123	---
			+85.0	+18.5	---	309
27	11 44	[3]	−54.0	+24.5	9	---
			−24.0	−22.5	---	62
			−17.5	−20.5	46	---
			+13.0	−12.5	---	62
			+18.5	−20.5	31	---
			+22.0	+19.0	---	46
			+33.0	− 9.5	93	---
28	11 45	[3]	−39.5	+24.0	15	---
			− 4.0	−20.5	31	---
			+28.0	−13.0	---	93
			+31.0	−20.5	31	---
			+37.5	+18.5	---	62
			+47.5	− 9.5	---	123
30	11 44	[3]	−70.0	−17.0	62	---
			−70.0	−20.0	77	---
			−15.0	+25.0	---	93
			+54.0	−12.5	---	123
			+74.0	− 9.5	93	---
31	11 45	[3]	−65.0	−15.0	46	---
			−58.0	−18.5	---	201
			−18.0	+15.5	---	46
			+32.5	−18.5	---	62
			+69.0	−12.0	---	154
			+72.0	−15.5	46	---
Sept. 1	11 48	[3]	−53.0	−18.0	31	---
			−44.0	−18.0	---	93
			− 5.0	+15.5	---	31
			+52.0	−16.0	---	93
2	11 42	[3]	−31.0	−18.0	---	62
			+64.5	−15.0	---	123
7	11 51	[3]	+ 3.0	−27.0	---	93
			+ 8.5	−13.5	---	46
8	11 48	[3]	+19.0	−27.5	---	62
			+22.0	−13.5	---	77

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1926	h m		°	°		
Sept. 9	11 39	(3)	+32. 0	−13. 5	---	77
10	11 42	(3)	−84. 0	+20. 5	93	---
			−75. 0	+19. 5	---	123
			−47. 0	+26. 5	---	93
11	11 41	(3)	−67. 5	+19. 5	---	77
			−60. 5	+19. 0	---	247
			−34. 0	+26. 5	---	185
12	11 47	(3)	−55. 0	+18. 0	---	93
			−48. 0	+18. 5	---	216
			−22. 5	+26. 5	---	31
			−17. 5	+25. 0	---	77
13	11 45	(3)	−78. 0	+23. 5	---	864
			−35. 5	+18. 5	---	216
			−11. 0	+27. 5	---	46
			− 2. 5	+25. 5	---	77
15	11 49	(3)	−74. 0	−10. 5	62	---
			−57. 0	+23. 0	---	617
			−47. 5	+25. 0	525	---
			− 8. 0	+18. 5	---	201
16	11 46	(3)	−59. 5	−10. 5	31	---
			−44. 0	+23. 0	---	556
			−33. 0	+24. 5	---	617
			−32. 0	−11. 0	---	46
			+ 4. 0	+18. 5	---	185
17	11 51	(3)	−46. 5	−10. 5	46	---
			−32. 0	+23. 0	---	710
			−20. 0	+23. 5	---	772
			−17. 0	−11. 0	15	---
			+17. 5	+18. 5	---	123
19	11 45	(3)	−72. 0	−15. 5	---	108
			−49. 0	+20. 0	31	---
			−18. 5	−11. 0	31	---
			− 8. 0	+23. 5	525	---
			− 2. 5	+22. 0	---	201
			+ 7. 0	+22. 5	---	741
			+42. 5	+18. 5	---	93
20	11 53	(3)	−59. 5	−14. 5	---	185
			+ 3. 5	+25. 0	---	494
			+12. 0	+22. 5	---	154
			+18. 0	+24. 5	---	864
			+57. 0	+18. 5	---	77
21	11 49	(3)	−47. 0	−15. 0	---	201
			+17. 0	+25. 5	494	---
			+22. 0	+23. 0	---	139
			+32. 0	+24. 0	---	679
			+34. 0	−12. 0	---	77
			+70. 5	+18. 0	31	---
23	11 49	(3)	−25. 5	−17. 5	---	170
			−17. 0	−14. 5	---	154
			+42. 0	+25. 0	448	---
			+48. 5	+23. 0	---	185
			+58. 5	+24. 0	---	679
			+65. 0	−12. 5	---	201

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1926	h m		°	°		
Sept. 24	11 47	(3)	−11. 5	−17. 0	---	123
			− 3. 5	−13. 5	---	247
			+12. 5	+ 9. 5	---	77
			+17. 5	+28. 5	---	62
			+42. 0	+25. 0	15	---
			+52. 5	+25. 0	432	---
			+60. 0	+23. 0	---	185
			+70. 0	+24. 5	---	679
25	11 46	(3)	+ 4. 0	−15. 5	---	154
			+10. 5	−14. 0	---	247
			+26. 0	+ 9. 5	---	93
			+28. 5	+28. 0	---	31
			+65. 0	+25. 0	370	---
			+70. 0	+23. 5	---	31
			+85. 0	+24. 0	---	432
Oct. 1	12 44	(3)	− 4. 5	−14. 5	31	---
			+12. 0	−21. 0	15	---
2	11 50	(3)	−28. 5	−10. 5	---	46
			−25. 0	−13. 0	---	31
			+ 9. 5	−13. 0	---	31
			+35. 5	−19. 5	15	---
3	11 46	(3)	−17. 5	−11. 0	9	---
			−13. 0	−10. 0	12	---
			−10. 0	−13. 5	---	31
			+ 1. 0	+13. 0	9	---
			+22. 0	−15. 0	---	31
4	11 47	(3)	−85. 0	+18. 0	---	525
			− 5. 0	−10. 5	31	---
			+ 1. 0	−10. 0	---	62
			+ 4. 5	−14. 0	31	---
			+14. 0	+14. 5	---	31
			+35. 0	−14. 5	31	---
5	11 46	(3)	−87. 0	− 9. 0	278	---
			−77. 0	+19. 0	---	494
			−68. 0	+17. 5	---	216
			+36. 0	−16. 0	---	93
			+37. 5	−14. 0	---	31
6	11 44	(3)	−69. 0	− 9. 0	154	---
			−60. 5	+18. 5	---	494
			−53. 5	+17. 5	---	247
			+33. 5	−17. 0	---	62
			+50. 0	−14. 5	---	93
7	11 48	(3)	−80. 5	+18. 0	---	340
			−57. 5	− 9. 0	123	---
			−49. 0	+18. 5	---	309
			−38. 5	+17. 5	---	278
			−19. 5	+13. 5	---	185
			+47. 0	−17. 0	---	62
			+67. 0	−15. 0	---	154
8	11 46	(3)	−75. 0	+19. 5	---	123
			−67. 0	+17. 5	---	340
			−42. 0	− 9. 0	---	93
			−37. 0	+18. 0	---	340

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1926	h m		°	°		
Oct. 8	11 46	(3)	−26. 5	+17. 5	---	216
			− 7. 0	+13. 5	---	340
			+15. 5	−14. 0	---	62
			+59. 0	−17. 0	---	31
			+82. 0	−15. 0	---	185
9	11 45	(3)	−60. 5	+19. 5	---	123
			−54. 0	+17. 5	---	432
			−28. 0	− 9. 0	---	62
			−22. 5	+17. 5	---	401
			−12. 5	+17. 0	---	247
			+ 8. 0	+13. 5	---	370
			+28. 0	−14. 5	---	62
10	11 46	(3)	−81. 5	+24. 0	---	247
			−68. 0	−11. 0	93	---
			−48. 0	+18. 0	---	123
			−40. 0	+17. 0	---	432
			−16. 0	− 9. 0	31	---
			− 9. 5	+18. 0	---	370
			+ 2. 0	+17. 5	247	---
			+19. 5	+14. 5	---	216
			+26. 5	+13. 0	---	123
12	11 48	(3)	−78. 0	+27. 5	93	---
			−54. 0	+25. 0	---	401
			−44. 0	− 9. 5	---	62
			−20. 5	+23. 0	---	62
			−17. 5	+18. 0	---	216
			−12. 5	+16. 5	216	---
			+11. 0	− 9. 0	31	---
			+17. 0	+18. 0	---	309
			+27. 5	+17. 0	---	216
			+51. 0	+14. 5	---	525
14	12 2	(3)	−53. 0	+27. 0	62	---
			−27. 0	+25. 0	---	463
			+10. 5	+18. 0	---	62
			+14. 0	+16. 0	216	---
			+31. 0	−12. 0	---	93
			+37. 0	− 9. 5	31	---
			+42. 5	+18. 5	---	340
			+47. 0	+17. 0	---	154
			+54. 0	+16. 5	278	---
			+74. 0	+13. 5	---	556
15	11 48	(3)	−41. 5	+27. 0	62	---
			−14. 5	+24. 5	---	401
			+22. 5	+19. 5	---	123
			+27. 5	+16. 5	216	---
			+44. 0	−12. 5	---	123
			+50. 5	− 9. 5	31	---
			+55. 0	+18. 0	---	401
			+62. 0	+17. 0	---	123
			+68. 0	+17. 0	---	216
			+90. 0	+14. 0	---	556
17	11 47	(3)	−60. 5	−16. 0	185	---
			−15. 5	+27. 5	31	---
			+12. 5	+24. 5	---	370
			+53. 5	+17. 0	185	---
			+80. 0	+19. 0	556	---
18	11 59	(3)	−48. 0	−16. 5	216	---
			− 3. 0	+28. 0	31	---
1926 Oct. 18	11 59	(3)	+27. 5	+24. 5	---	370
			+68. 0	+17. 0	185	---
19	11 48	(3)	−35. 5	−17. 0	---	185
			+ 3. 5	+27. 0	---	62
			+10. 5	+25. 0	31	---
			+38. 5	+24. 0	---	309
			+78. 0	+17. 0	216	---
21	11 51	(3)	−79. 0	+ 8. 0	154	---
			− 9. 5	−17. 5	---	93
			+65. 0	+23. 5	216	---
22	11 48	(3)	−59. 5	+ 8. 0	---	185
			+ 4. 0	−17. 0	93	---
			+78. 0	+23. 5	185	---
25	11 46	(3)	−78. 0	−13. 0	---	216
			−65. 0	−12. 0	185	---
			−51. 5	−12. 5	62	---
			−17. 5	+ 9. 0	---	185
			+ 3. 5	−23. 0	---	62
			+43. 5	−17. 0	---	93
26	11 47	(3)	−64. 0	−13. 5	---	154
			−58. 0	+18. 5	---	123
			−52. 5	−12. 0	---	278
			−39. 0	−12. 5	---	62
			− 4. 0	+ 9. 0	---	123
			+17. 5	−23. 0	---	93
			+56. 0	−16. 5	62	---
27	11 47	(3)	−70. 0	−16. 0	154	---
			−50. 5	−13. 5	---	123
			−47. 0	+18. 0	---	31
			−39. 5	−11. 5	247	---
			−25. 5	−12. 0	---	93
			+ 4. 5	+ 9. 0	---	62
			+19. 0	+23. 5	---	93
			+33. 0	−22. 0	62	---
28	11 47	(3)	−57. 0	−15. 5	123	---
			−37. 0	−13. 5	---	123
			−27. 5	−11. 5	---	309
			−12. 0	−12. 0	---	31
			+23. 0	+ 9. 0	---	62
			+30. 0	+23. 0	---	31
			+36. 0	+22. 5	31	---
			+47. 5	−22. 5	---	62
30	11 41	(3)	−29. 5	−17. 0	62	---
			− 9. 0	−15. 0	---	93
			− 0. 5	−13. 0	185	---
			+16. 0	−14. 0	31	---
			+49. 5	+ 9. 0	---	31
			+68. 5	−23. 0	31	---
			+78. 0	−21. 0	93	---
Nov. 1	11 45	(3)	−83. 0	+16. 5	93	---
			−27. 0	+19. 0	---	62
			− 3. 0	−17. 0	62	---
			+26. 0	−13. 0	216	---
3	11 42	(3)	−57. 5	+17. 0	---	154
			+ 3. 0	+19. 0	31	---

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1926	h m		°	°		
Nov. 3	11 42	(3)	+12.0	+18.0	---	62
			+25.0	−16.0	31	---
			+52.0	−12.5	247	---
4	11 42	(3)	−74.0	+17.5	216	---
			−45.0	+16.5	62	---
			−39.5	−22.0	---	62
			+13.5	+19.5	---	31
			+39.5	−15.0	31	---
			+67.5	−12.5	216	---
5	11 43	(3)	−60.5	+17.5	185	---
			−31.0	+17.0	62	---
			−27.0	−22.0	---	62
			+29.0	+20.0	31	---
			+60.0	+22.0	31	---
			+80.0	−12.5	216	---
6	11 44	(3)	−48.0	+17.5	123	---
			−21.0	+20.0	---	31
			−16.0	+17.0	---	62
7	11 48	(3)	−34.0	+17.5	---	123
			− 6.0	+20.0	---	31
			− 1.0	+17.0	---	154
10	11 40	(3)	−52.5	−12.0	---	154
			+ 3.0	+15.5	---	154
			+37.0	+16.0	31	---
11	11 51	(3)	−69.5	+28.5	62	---
			−69.5	+25.5	---	62
			−62.5	+24.5	31	---
			−38.5	−11.5	---	93
			+17.5	+16.0	---	154
12	11 45	(3)	−59.0	+28.5	---	62
			−50.0	+23.0	31	---
			−24.5	−12.0	62	---
			+31.0	+17.0	---	123
13	11 45	(3)	−45.0	+29.0	31	---
			−37.5	+23.5	---	62
			−10.5	−12.0	62	---
			+29.5	−10.5	31	---
			+44.5	+17.0	---	154
14	12 10	(3)	−32.5	+30.0	---	31
			−26.0	+24.0	---	31
			−25.0	+18.0	---	62
			+ 3.0	−11.0	31	---
			+59.0	+17.0	---	123
			+60.0	+12.0	31	---
17	11 45	(3)	+12.5	+19.0	---	62
			+18.0	+18.0	---	93
19	11 44	(3)	−57.0	−25.0	---	62
			+13.0	−19.0	---	62
			+42.5	+19.0	---	62
			+47.0	+17.5	---	93
22	11 45	(3)	−67.5	+19.0	31	---
			−58.0	−10.0	123	---
			−56.5	+18.0	123	---
1926	h m		°	°		
Nov. 22	11 45	(3)	−16.0	−24.0	---	309
			−11.5	−12.0	---	93
			− 8.0	+27.0	31	---
			+46.5	+ 8.0	---	185
			+53.0	−19.5	---	93
			+62.5	−26.0	31	---
23	11 45	(3)	−80.0	−14.5	---	216
			−55.5	+19.0	31	---
			−45.0	−10.0	93	---
			−44.0	+18.0	123	---
			− 6.0	−25.0	---	31
			+ 1.0	−23.0	31	---
			+ 2.0	−12.0	---	247
			+ 5.5	+26.5	31	---
			+59.0	+ 8.5	---	247
			+68.0	−20.5	31	---
			+75.0	−26.0	62	---
25	11 39	(3)	−54.0	−15.5	---	247
			−27.0	+18.5	31	---
			−18.5	− 9.5	93	---
			−18.0	+18.0	123	---
			+21.5	−23.0	---	93
			+26.0	−13.5	---	62
			+28.5	−22.5	---	93
			+32.0	+ 9.0	31	---
			+33.5	−10.5	---	93
27	11 47	(3)	−26.0	−15.5	---	278
			+ 8.5	+18.0	---	93
			+ 9.0	−10.0	62	---
			+48.0	−24.5	---	154
			+55.5	−23.5	---	123
			+65.0	−12.0	---	62
28	11 58	(3)	−43.0	− 9.5	---	31
			−18.0	−17.5	---	62
			−11.0	−14.5	---	401
			+22.0	−10.5	93	---
			+22.5	+18.0	93	---
			+69.0	−27.0	---	93
			+79.0	−12.5	---	62
Dec. 1	13 8	(3)	−58.0	+11.5	---	154
			−52.5	+12.0	---	62
			−10.5	+13.5	---	62
			− 4.0	−10.0	---	31
			+ 3.0	− 9.5	---	62
			+27.5	−13.5	---	432
			+34.0	−12.5	---	31
			+62.5	+19.5	93	---
			+64.0	−10.0	62	---
2	11 47	(3)	−47.0	+11.5	---	154
			−40.0	+12.0	62	---
			+ 2.0	+13.5	---	93
			+ 9.5	−10.5	---	62
			+17.0	− 9.5	---	62
			+40.0	−13.5	370	---
			+47.5	−12.5	---	15
			+67.0	+19.0	93	---
6	11 46	(3)	−44.5	−27.5	---	62
			−44.0	+18.5	154	---

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1926	h m		°	°		
Dec. 6	11 46	(3)	−37.0	−27.5	---	93
			+8.0	+11.5	---	31
			+57.0	+14.0	---	247
7	11 40	(3)	−56.5	−10.0	---	93
			−31.0	+19.0	185	---
			−30.5	−27.5	---	31
			−24.0	−27.5	---	62
			+20.5	+12.0	---	62
			+71.0	+14.0	---	216
10	11 55	(3)	−74.0	+7.5	---	340
			−57.5	−5.0	154	---
			−56.5	−24.0	62	---
			−17.0	−9.5	---	309
			−10.5	−11.0	---	247
			+8.0	+19.0	185	---
11	11 43	(3)	−58.0	+7.0	---	278
			−44.0	−5.5	93	---
			−44.0	−24.5	31	---
			−3.5	−10.5	---	247
			+2.0	−11.5	---	247
			+21.0	+19.0	185	---
12	11 45	(3)	−85.0	+16.0	185	---
			−45.0	+7.0	---	432
			−25.0	−5.5	62	---
			+10.0	−10.5	---	247
			+16.0	−11.0	---	216
			+33.5	+19.0	185	---
14	11 45	(3)	−55.5	+16.0	123	---
			−27.5	−19.5	---	93
			−16.5	+7.5	---	648
			−2.5	−5.5	93	---
			+38.0	−10.5	---	185
			+42.5	−11.5	---	216
			+61.0	+19.0	247	---
16	11 46	(3)	−28.5	+17.5	93	---
			+2.0	−19.5	62	---
			+11.0	+7.5	---	710
			+26.0	−5.0	31	---
			+67.0	−10.5	---	247
18	11 45	(3)	−70.0	+17.5	---	463
			−62.0	+33.0	370	---
			−2.0	+18.0	62	---
			+29.5	−18.5	---	31
			+38.0	+8.0	---	895
			+52.5	−16.0	31	---
19	11 23	(3)	−59.5	−23.5	31	---
			−58.0	+18.0	---	216
			−52.5	+11.0	31	---
			−49.5	+33.0	278	---
			+11.0	+17.5	93	---
			+44.0	−17.5	31	---
			+46.0	+8.0	---	556
			+51.0	−19.5	---	31
			+57.0	+8.0	---	648
			+66.0	−6.0	62	---

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1926	h m		°	°		
Dec. 23	11 40	(3)	−45.0	−12.0	31	---
			−8.5	−25.5	---	278
			−4.5	+17.0	---	123
			0.0	+34.0	---	278
			+27.0	−19.0	---	93
			+54.5	−9.5	---	93
			+65.0	+18.0	62	---
26	11 47	(3)	−75.0	−8.0	---	278
			+26.0	−28.5	---	123
			+34.5	−23.0	---	93
			+36.0	+16.0	62	---
			+38.0	+34.0	---	216
			+49.5	−7.0	31	---
			+50.5	+27.0	---	31
27	11 47	(3)	−62.5	−8.5	---	617
			+40.0	−29.5	---	93
			+47.0	−24.5	---	62
			+49.5	+33.0	---	247
			+50.0	+15.0	93	---
			+63.0	+27.0	---	216
29	11 38	(3)	−70.5	+9.5	---	123
			−61.0	+10.0	---	278
			−37.0	−8.5	---	494
			+60.0	+23.0	---	93
			+77.5	+32.5	---	216
30	11 45	(3)	−58.0	+10.5	---	216
			−48.0	+10.0	---	370
			−23.5	−8.5	---	432
			+76.0	+22.0	---	123
31	11 47	(3)	−42.5	+9.5	93	---
			−34.0	+10.0	216	---
			−9.5	−8.5	---	432
1927 Jan. 2	11 48	(3)	−88.0	−12.0	---	309
			−53.5	+20.0	62	---
			−17.0	+10.0	62	---
			−8.0	+10.5	---	247
			+20.5	−8.0	---	401
4	11 34	(3)	−57.5	−14.0	---	278
			−49.0	−12.0	432	---
			−28.0	+20.0	62	---
			+11.0	+10.5	---	31
			+19.5	+10.5	---	340
			+47.5	−8.0	340	---
5	11 43	(3)	−68.5	−16.0	---	185
			−47.0	−14.0	---	123
			−43.0	−17.5	---	93
			−37.0	−13.5	---	401
			−14.0	+19.5	62	---
			+33.0	+9.5	---	216
			+62.0	−8.5	340	---
6	11 45	(3)	−68.0	+7.5	31	---
			−57.0	−17.0	---	309
			−32.0	−12.5	---	123
			−28.5	−17.5	---	123

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1927	h m		°	°		
Jan. 6	11 45	[3]	−22.0	−13.0	---	432
			−1.0	+19.5	31	---
			+1.0	−26.0	---	31
			+36.0	+6.0	9	---
			+47.5	+9.5	---	123
			+74.0	−8.5	370	---
7	11 46	[3]	−57.5	+7.0	93	---
			−52.0	+7.5	93	---
			−48.0	−17.5	---	93
			−41.5	−16.0	---	247
			−18.5	−13.0	---	62
			−16.0	−16.5	---	123
			−8.5	−13.0	---	370
			+12.0	+19.5	31	---
			+15.0	−25.0	---	154
			+59.5	+10.5	---	185
8	11 46	[3]	−59.0	−17.5	93	---
			−41.0	+8.0	---	123
			−30.0	−16.0	---	247
			−3.0	−15.0	---	216
			+4.5	−12.5	---	370
			+24.5	+19.5	31	---
			+28.0	−25.0	---	93
			+43.0	−13.0	---	62
			+75.0	+10.0	---	185
9	11 55	[3]	−47.0	−17.5	31	---
			−26.5	+8.0	---	216
			−17.5	−16.5	---	370
			+11.0	−15.5	---	216
			+18.5	−13.0	---	340
			+38.5	+19.0	31	---
			+42.0	−25.5	---	93
			+57.5	−13.0	---	62
10	11 45	[3]	−13.5	+8.0	---	432
			−4.0	−17.0	---	494
			+23.0	−14.0	---	340
			+31.0	−13.5	309	---
			+50.5	+19.0	62	---
			+57.5	−26.0	62	---
			+72.5	−12.5	31	---
11	11 47	[3]	+1.0	+8.0	---	525
			+8.0	−16.5	---	370
			+37.5	−13.5	---	309
			+45.0	−13.5	309	---
			+64.0	+19.5	62	---
			+72.5	−25.0	31	---
12	11 47	[3]	−16.5	+17.0	19	---
			+15.5	+8.0	---	370
			+17.5	+14.0	---	62
			+22.5	−17.5	---	309
			+52.0	−14.5	---	309
			+59.0	−14.0	---	401
15	11 57	[3]	−85.0	+33.5	247	---
			−78.5	−14.5	---	494
			−47.5	+26.0	648	---
			+58.0	+8.0	---	62
			+64.5	−15.0	---	93

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1927	h m		°	°		
Jan. 16	11 49	[3]	−72.0	−15.0	---	309
			−65.0	+33.5	278	---
			−61.5	−13.5	309	---
			−36.0	+25.0	---	802
			+14.0	+27.0	---	154
			+80.0	−15.0	---	185
17	13 10	[3]	−57.5	−15.0	---	247
			−48.0	+33.5	278	---
			−47.0	−13.5	340	---
			−22.0	+26.0	---	741
			−18.0	+13.5	---	123
			+25.5	+27.5	---	93
20	12 2	[3]	−18.0	−16.0	---	93
			−12.0	+33.5	247	---
			−8.0	−13.0	---	340
			+17.0	+26.0	---	772
			+24.0	+14.0	31	---
22	11 51	[3]	−73.0	−5.5	---	123
			−25.0	−9.5	---	62
			+8.5	−14.5	---	93
			+13.0	+33.5	---	216
			+18.0	−13.5	309	---
			+42.0	+26.0	---	648
25	11 50	[3]	−32.5	−7.5	---	62
			+48.0	−14.5	---	62
			+49.0	+33.5	---	247
			+57.5	−15.0	247	---
27	11 55	[3]	−80.0	+11.0	---	154
			−73.5	−17.5	62	---
			−5.5	−7.5	46	---
			+75.0	+33.0	---	247
			+85.0	−14.5	278	---
31	11 45	[3]	−53.0	−27.5	---	340
			−48.0	−13.0	---	340
			−29.0	+11.0	---	216
			−20.5	−15.0	---	370
			+22.0	−17.0	---	401
			+33.0	−9.0	---	31
			+50.0	−8.0	---	31
			+74.5	−7.0	62	---
Feb. 1	11 54	[3]	−67.5	+22.0	154	---
			−59.0	+22.0	---	62
			−38.5	−28.0	---	247
			−35.0	−13.5	---	309
			−17.0	+11.0	---	185
			−7.0	−15.5	---	370
			+34.5	−16.5	---	494
2	11 51	[3]	−79.0	+11.0	123	---
			−70.0	+17.0	93	---
			−53.5	+24.0	---	62
			−45.0	+24.5	---	31
			−27.5	−15.5	---	309
			−27.0	−27.5	---	154
			−17.5	−11.0	31	---
			−6.0	+13.5	---	46

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1927	h m		°	°		
Feb. 2	11 51	(3)	0.0	+11.0	108	---
			+6.0	−15.5	---	463
			+47.5	−17.5	---	525
3	11 47	(3)	−80.0	−15.0	154	---
			−64.0	+9.5	123	---
			−57.5	+15.0	154	---
			−40.5	+22.5	15	---
			−32.0	+24.5	---	25
			−18.0	+23.0	---	62
			−14.0	−16.0	---	309
			−14.0	−28.0	---	123
			−4.5	−11.0	31	---
			+8.0	+15.5	9	---
			+12.5	+11.0	123	---
			+19.5	−16.0	---	463
			+61.0	−17.5	---	525
4	13 47	(3)	−70.0	−14.0	---	370
			−49.5	+10.0	93	---
			−42.5	+15.5	---	93
			−17.0	+25.0	31	---
			−5.5	+24.0	15	---
			−4.0	−28.0	---	25
			+1.0	−16.0	---	370
			+4.5	−28.0	---	62
			+10.5	−11.0	---	15
			+28.0	+11.0	93	---
			+35.5	−15.0	---	278
			+75.0	−18.0	---	463
7	11 53	(3)	−56.0	+14.0	---	31
			−33.0	−7.5	---	62
			−30.5	−14.0	---	556
			−15.5	−12.5	---	62
			−11.0	+9.0	---	108
			−1.5	+16.0	---	309
			+29.0	+25.0	---	46
			+39.0	−17.5	---	370
			+43.0	−28.0	---	46
			+66.0	+11.0	123	---
			+78.5	−13.0	---	154
9	11 48	(3)	−67.0	−27.5	123	---
			−4.5	−8.0	---	93
			−4.0	−15.0	---	463
			+16.0	+5.5	---	278
			+18.5	+10.0	46	---
			+26.5	+17.0	---	216
			+37.0	+26.5	---	31
			+58.0	+25.5	---	123
			+64.0	−17.0	---	309
			+70.0	−29.0	---	43
10	11 48	(3)	−54.5	−28.0	123	---
			+8.5	−8.0	---	93
			+9.5	−15.5	---	432
			+29.0	+5.5	---	247
			+31.5	+10.0	46	---
			+40.0	+17.0	---	154
			+69.0	+25.0	123	---
			+82.0	−17.0	---	309
			+83.0	−29.0	62	---
1927	h m		°	°		
Feb. 11	11 47	(3)	−83.0	−13.0	123	---
			−41.0	−28.0	123	---
			+24.0	−8.0	---	309
			+24.0	−15.0	---	370
			+44.0	+5.5	---	247
			+45.5	+10.0	62	---
			+51.0	+16.0	---	278
			+59.5	+18.0	62	---
12	11 56	(3)	−68.0	−13.0	123	---
			−28.0	−28.5	---	123
			+37.5	−8.0	---	185
			+39.0	−13.5	---	401
			+58.5	+6.5	---	154
			+59.0	+10.5	46	---
			+70.0	+17.5	---	123
15	11 45	(3)	−48.0	+32.5	---	93
			−37.0	+11.0	---	123
			−29.5	−13.5	123	---
			+11.0	−28.5	93	---
			+17.5	+13.0	---	31
			+79.5	−13.0	309	---
16	11 31	(3)	−37.0	+32.0	---	62
			−23.0	+10.5	---	216
			−17.0	−14.0	123	---
			+24.5	−27.0	77	---
			+34.0	+15.0	31	---
17	11 45	(3)	−62.5	+12.0	---	185
			−25.0	+34.0	31	---
			−8.0	+10.5	---	154
			−4.5	−13.5	---	123
			+37.5	−27.5	93	---
			+49.0	+14.0	31	---
18	12 1	(3)	−52.0	+12.5	---	31
			−49.0	−9.5	---	31
			−44.0	+11.5	---	93
			−12.0	+34.0	31	---
			+4.5	+10.5	---	123
			+9.5	−13.5	108	---
			+50.0	−27.5	93	---
21	12 36	(3)	−68.0	+13.5	123	---
			−59.5	−26.0	31	---
			−46.0	+15.0	15	---
			−6.5	−9.5	---	154
			+49.0	−13.5	108	---
22	11 45	(3)	−55.0	+13.5	---	123
			−47.5	−26.0	---	31
			−30.0	+11.5	---	46
			+7.0	−10.5	---	185
			+7.0	−18.5	---	31
			+57.5	+12.5	31	---
			+60.5	−14.0	108	---
24	11 48	(3)	−85.0	−18.0	139	---
			−67.0	−18.5	15	---
			−27.0	+14.0	---	46
			−3.0	+11.0	---	46
			+34.5	−10.5	---	123

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1927	h m		°	°		
Feb. 26	11 46	(3)	-52.5	-18.0	139	---
			-40.5	-18.0	15	---
			+1.0	+14.0	---	77
			+12.0	-18.0	---	31
			+66.0	-9.5	---	62
27	11 46	(3)	-64.0	+22.0	31	---
			-42.0	-18.0	---	123
			-37.0	-24.5	9	---
			+12.5	+14.0	---	123
			+17.5	-26.5	---	31
			+28.0	-17.5	---	15
28	11 45	(3)	-54.0	+22.0	---	62
			-27.5	-18.0	---	139
			-23.5	-12.0	---	31
			+27.0	+15.0	---	123
			+33.0	-25.0	---	25
Mar. 1	11 31	(3)	-44.0	+23.0	---	62
			-13.5	-18.0	123	---
			+40.5	+13.5	---	93
			+44.5	-23.0	---	31
3	11 44	(3)	-72.0	-13.0	185	---
			-71.0	+10.0	---	62
			-17.0	+23.5	---	93
			+13.0	-17.5	123	---
			+28.0	-18.0	---	46
			+62.0	+13.5	---	31
4	11 48	(3)	-59.5	-13.5	247	---
			-59.0	+10.0	62	---
			-3.0	+23.5	---	93
			+25.5	-17.5	---	154
			+41.5	-17.5	---	62
5	11 50	(3)	-49.0	-20.0	---	62
			-47.0	-13.0	185	---
			-45.5	+10.0	31	---
			+12.5	+22.0	---	77
			+39.0	-18.0	108	---
			+54.0	-17.5	---	123
6	11 42	(3)	-38.0	-20.5	46	---
			-32.5	-13.5	154	---
			-32.0	+19.5	---	31
			-31.5	+10.0	31	---
			+20.0	+24.5	31	---
			+28.0	+21.5	---	93
			+52.0	-18.0	123	---
			+71.0	-17.0	62	---
7	13 40	(3)	-22.0	-22.5	---	62
			-19.5	+18.0	---	46
			-19.0	-15.5	154	---
			-18.5	+10.0	---	31
			+33.0	+27.0	---	31
			+42.5	+22.0	---	108
			+66.0	-15.5	93	---
8	11 50	(3)	-24.0	+10.0	---	9
			-11.0	-22.0	---	62
1927 Mar. 8	11 50	(3)	-7.5	-13.5	154	---
			-7.0	+19.0	---	46
			-5.0	+10.0	9	---
			+47.0	+26.0	---	31
			+56.0	+22.0	---	62
			+62.5	-19.0	37	---
			+70.0	+7.5	---	123
			+77.5	-17.5	123	---
10	11 49	(3)	-34.0	-20.0	---	15
			-32.5	+16.5	---	108
			+18.5	-21.0	---	31
			+19.0	-14.5	139	---
			+77.5	-21.0	---	93
11	11 46	(3)	-78.5	-9.5	154	---
			-19.5	-19.5	---	62
			-19.0	+15.5	---	262
			+29.0	-21.0	---	62
			+31.5	-14.5	154	---
12	11 42	(3)	-65.0	-9.5	154	---
			-5.0	+15.5	---	216
			-5.0	-19.0	---	46
			+44.5	-14.0	---	139
13	11 41	(3)	-78.0	+17.5	123	---
			-71.5	+31.0	154	---
			-52.0	-9.5	185	---
			+7.5	+15.5	---	154
			+7.5	-18.0	---	15
			+50.5	+17.5	---	19
			+59.0	-12.5	139	---
			+59.5	-18.5	---	31
15	11 45	(3)	-64.0	-9.0	---	247
			-57.0	+35.0	---	679
			-49.5	+18.0	123	---
			-45.0	+31.0	154	---
			-26.0	-9.5	154	---
			-24.0	+19.5	---	31
			+37.5	+15.5	---	123
			+85.0	-12.5	154	---
16	11 46	(3)	-55.5	-11.0	---	31
			-47.0	-8.0	---	123
			-44.0	+35.0	---	710
			-37.0	+18.0	123	---
			-31.0	+31.0	154	---
			-12.0	-9.0	139	---
			-9.5	+19.0	---	123
			+51.0	+15.5	---	93
17	11 57	(3)	-66.0	-10.0	---	31
			-54.0	-10.5	---	31
			-42.0	-11.0	---	31
			-33.5	-8.0	---	123
			-32.0	+34.0	---	586
			-22.5	+18.0	108	---
			-19.0	+31.0	154	---
			+1.0	-9.0	123	---
			+3.5	+18.5	---	77
			+68.0	+16.0	---	93

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1927	h m		°	°		
Mar. 18	11 42	(3)	-52.0	-10.0	---	15
			-40.0	-10.5	---	108
			-19.5	-8.0	---	62
			-18.0	+34.0	---	432
			-10.0	+18.0	108	---
			-7.5	+31.0	154	---
			+14.5	-9.0	123	---
			+16.0	+18.5	---	216
			+82.0	+15.0	62	---
19	11 33	(3)	-38.0	-9.5	---	9
			-26.0	-10.5	---	185
			-7.5	-9.0	---	46
			-5.0	+34.0	---	463
			+3.5	+18.0	93	---
			+7.5	+30.5	154	---
			+28.5	-9.5	---	93
			+29.5	+18.5	---	185
20	12 38	(3)	-29.5	-10.5	---	46
			-11.0	-10.5	---	154
			+2.0	+15.0	15	---
			+7.0	+34.5	---	185
			+7.5	-9.5	31	---
			+17.5	+18.0	123	---
			+19.5	+30.5	---	216
			+42.0	-9.5	62	---
			+42.5	+18.5	---	185
22	11 45	(3)	+15.0	-11.0	---	139
			+32.0	+35.0	---	370
			+33.5	-10.0	31	---
			+44.0	+18.0	123	---
			+44.5	+31.0	185	---
			+67.5	+18.0	---	185
			+69.5	-9.0	31	---
23	13 16	(3)	-44.0	-17.0	---	50
			+30.0	-11.5	---	108
			+44.0	+35.0	---	216
			+58.5	+17.5	62	---
			+59.0	+31.0	139	---
24	12 55	(3)	-65.0	+11.0	62	---
			-29.0	-17.5	---	31
			+45.0	-11.0	---	46
			+58.0	+34.5	---	154
			+70.0	+30.5	123	---
			+71.0	+17.5	108	---
25	11 45	(3)	-52.0	+10.5	31	---
			-15.0	-17.0	---	15
			+10.5	-9.0	---	46
			+55.0	-12.0	---	31
			+69.5	+35.0	---	123
			+85.0	+17.5	154	---
			+86.0	+30.5	154	---
26	13 58	(3)	-57.5	-41.0	---	31
			-37.5	+11.0	31	---
			-11.5	-15.0	9	---
			+24.0	-9.5	---	62
1927	h m		°	°		
Mar. 27	13 24	(3)	-24.0	+11.0	31	---
			+38.0	-9.5	---	62
			+44.0	+15.0	---	62
28[2]	14 8	(3)	----	----	---	---
29	11 43	(3)	-78.0	+17.5	154	---
			-7.5	-24.0	---	62
31	13 41	(3)	-80.0	+12.0	309	---
			-49.5	-13.5	---	15
			-49.0	+17.5	108	---
			-2.5	+11.0	---	15
Apr. 3	14 3	(3)	-56.0	+14.0	93	---
			-43.0	+13.5	---	710
			-38.0	-24.0	62	---
			-10.5	-15.0	---	19
			-8.5	+17.5	46	---
			-4.0	-13.0	---	40
			+54.0	+15.5	---	62
			+61.5	-22.5	---	340
6	11 46	(3)	-82.0	-17.0	---	247
			-69.0	-13.5	---	278
			-16.0	+14.5	62	---
			-5.0	+14.0	---	463
			+30.5	+16.5	40	---
			+37.0	+22.0	---	62
			+71.0	-13.5	---	123
7	11 47	(3)	-68.0	-17.0	---	278
			-55.0	-14.0	---	278
			+7.0	+12.5	---	463
			+42.5	+16.5	15	---
			+50.0	+22.0	---	46
			+85.0	-15.0	123	---
10	12 7	(3)	-79.0	+30.0	216	---
			-78.0	-7.0	---	247
			-45.0	-22.5	---	46
			-38.5	+13.5	---	123
			-26.0	-17.5	---	278
			-14.0	-14.0	---	185
			+34.5	+13.5	---	31
			+51.0	+12.5	---	432
			+72.0	+5.0	---	62
11	11 51	(3)	-80.0	+11.0	---	309
			-72.0	+33.0	---	741
			-69.0	-7.0	---	46
			-68.0	-14.5	---	62
			-60.5	-7.5	---	93
			-29.0	-21.5	---	46
			-25.0	+14.0	---	108
			-20.0	-18.5	9	---
			-10.5	-18.0	---	278
			-0.5	-13.0	---	139
			+63.0	+13.0	---	370
12	11 46	(3)	-67.0	+11.5	---	216
			-58.0	+32.5	---	216
			-57.0	-5.5	25	---

[2] No spots.

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1927	h m		°	°		
Apr. 12	11 46	(3)	−53.0	−15.0	---	139
			−47.5	− 7.5	---	31
			−15.0	−21.5	---	31
			−12.5	+13.5	---	77
			− 0.5	−18.0	---	370
			+12.5	−13.0	---	139
			+79.0	+13.0	---	278
14	11 49	(3)	−49.5	+18.0	---	31
			−42.0	+11.0	---	77
			−30.5	+32.5	---	123
			−27.5	−15.0	---	185
			+11.5	−21.0	---	15
			+12.5	+14.5	---	123
			+21.5	+14.5	---	31
			+24.0	−19.0	---	432
			+39.5	−13.0	---	46
15	11 42	(3)	−37.0	+18.0	31	---
			−28.0	+11.0	---	62
			−27.0	−12.0	---	154
			−13.5	+30.0	43	---
			−13.5	−15.0	---	216
			+25.0	−11.0	25	---
			+27.0	+14.5	---	123
			+34.0	+14.5	19	---
			+37.0	−19.0	---	340
			+52.5	−12.5	---	77
16	11 41	(3)	−21.0	+21.0	---	22
			−17.5	+13.0	---	15
			−13.0	−10.0	---	247
			−10.0	+12.0	---	46
			− 5.0	+36.5	31	---
			− 2.0	−14.0	---	185
			+ 2.0	+31.0	46	---
			+37.0	−23.5	22	---
			+43.0	+12.5	---	216
			+49.5	−20.0	---	370
			+62.0	−16.0	---	62
17	11 42	(3)	+ 1.0	−10.5	---	370
			+11.0	+30.5	31	---
			+13.0	−14.0	---	139
			+54.0	−21.0	---	46
			+54.0	+14.0	---	185
			+63.0	−17.0	---	154
			+78.0	−11.5	62	---
18	11 44	(3)	−73.5	+ 9.5	108	---
			+14.5	−10.5	---	370
			+24.0	+30.5	25	---
			+28.0	−14.0	---	139
			+67.0	+15.0	---	123
			+79.0	−17.0	---	185
20	11 49	(3)	−73.5	−19.5	62	---
			−45.0	+ 9.5	---	46
			+34.5	−10.5	123	---
			+44.0	−10.5	170	---
			+49.5	+30.0	15	---
			+57.0	−13.5	---	123
1927	h m		°	°		
Apr. 21	11 40	(3)	−60.0	−20.0	123	---
			−32.0	+ 9.5	31	---
			−22.0	+24.5	---	31
			+48.0	−10.5	139	---
			+58.5	−10.5	231	---
			+70.0	−13.5	---	123
23	11 53	(3)	−58.5	−15.0	---	93
			−34.0	−20.0	56	---
			− 6.5	+ 9.5	25	---
			+ 3.0	+24.5	---	93
			+74.0	−10.0	154	---
			+85.0	−10.0	247	---
24	12 28	(3)	−46.0	−17.0	---	108
			−20.0	−20.0	62	---
			+16.5	+24.0	---	108
25	11 47	(3)	−76.5	+ 5.0	216	---
			−33.0	−17.5	---	201
			− 7.0	−20.0	46	---
			+29.0	+24.0	---	93
27	12 15	(3)	−49.5	+ 4.5	170	---
			−32.0	+21.0	---	93
			− 6.0	−16.5	---	185
			+19.5	−20.0	31	---
			+56.5	+24.5	31	---
28	11 47	(3)	−35.5	+ 4.5	154	---
			−17.5	+21.0	---	93
			+ 3.5	−17.5	---	93
			+ 9.5	−12.5	---	93
			+31.5	−20.0	31	---
May 1	11 48	(3)	− 5.0	−19.5	---	108
			+ 6.5	+ 4.5	---	108
			+50.0	−14.0	---	31
2	11 45	(3)	−74.0	+10.0	123	---
			+ 9.5	−19.5	---	216
			+19.5	+ 4.5	---	93
			+62.5	−13.5	---	46
3	11 48	(3)	−60.0	+10.0	77	---
			−54.0	−16.0	---	62
			+22.5	−19.5	---	247
			+33.0	+ 4.5	46	---
5	11 44	(3)	−38.5	− 8.0	---	139
			−26.0	−16.5	---	201
			+26.0	+22.0	---	62
			+44.5	−23.0	19	---
			+53.0	−18.0	---	247
7	12 25	(3)	−10.0	− 7.5	---	108
			+ 3.0	−14.5	---	216
			+14.0	+19.0	---	77
			+50.5	+23.5	15	---
			+84.0	−18.0	---	247
9	12 32	(3)	−70.0	−11.5	---	154
			−59.0	− 9.5	---	15

3 Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1927	h m		°	°		
May 9	12 32	(3)	−39.5	+19.0	15	---
			+14.5	− 5.0	25	---
			+22.0	− 8.0	46	---
			+27.0	−19.5	---	46
			+28.0	−14.0	---	170
			+45.0	+17.5	---	31
			+52.0	− 7.5	---	31
			+62.0	−25.0	---	154
10	12 33	(3)	−67.0	+20.0	93	---
			−57.0	−11.5	---	185
			−27.0	+19.5	---	108
			−15.0	+18.5	---	154
			+37.0	− 7.0	62	---
			+41.0	−19.5	---	62
			+47.5	−14.5	---	139
			+58.0	+18.0	---	46
			+75.0	−25.0	---	154
11	12 11	(3)	−82.0	−10.5	247	---
			−57.0	+20.0	---	77
			−43.5	−12.0	---	139
			−40.0	− 9.5	9	---
			−12.5	+19.0	---	123
			− 1.0	+18.5	---	340
			+27.0	+29.0	---	31
			+50.5	− 7.5	---	62
			+60.0	−14.5	---	108
			+71.0	+17.5	31	---
13	11 46	(3)	−55.0	−10.5	---	185
			−19.0	−11.0	---	154
			+11.0	+20.0	---	77
			+24.0	+17.5	---	741
15	11 56	(3)	−74.0	−14.0	---	170
			−29.0	−10.5	108	---
			+ 9.5	−10.5	25	---
			+38.5	+19.0	---	19
			+52.0	+17.5	---	957
			+68.0	+15.0	---	46
17	12 45	(3)	−60.0	− 8.0	---	46
			−47.5	+22.0	---	31
			−45.5	−13.0	---	77
			−27.0	−24.0	---	31
			− 1.5	− 9.5	---	62
			+63.0	+20.5	---	62
			+79.0	+17.5	---	1019
19	12 1	(3)	−60.0	+ 4.0	---	62
			−34.5	− 8.0	---	123
			−19.0	−12.5	---	62
			−17.5	+21.0	9	---
			+ 0.5	−24.0	---	123
			+42.0	+20.5	---	93
			+66.0	+27.0	15	---
20	11 48	(3)	−47.5	+ 4.0	62	---
			−19.5	− 8.0	---	154
			− 6.5	−12.5	---	62
			− 4.0	+20.5	15	---
			+13.0	−23.5	---	139
			+55.0	+20.0	---	185
1927	h m		°	°		
May 21	13 33	(3)	−72.5	−10.0	---	93
			−53.0	−12.0	---	31
			−34.0	+ 4.0	25	---
			− 4.5	− 8.0	---	170
			+ 9.5	−13.0	31	---
			+27.5	−23.0	---	77
			+74.0	+20.0	62	---
22	11 46	(3)	−78.0	+17.5	154	---
			−60.0	− 9.5	123	---
			−41.0	−12.0	---	31
			−22.0	+ 4.0	15	---
			+ 8.0	− 7.5	---	185
			+21.5	−13.0	41	---
			+40.0	−23.0	---	31
			+56.0	−27.0	---	31
23	13 41	(3)	−62.0	+17.0	31	---
			−48.0	− 9.5	---	93
			−35.0	−27.0	---	31
			− 7.5	+ 4.0	15	---
			+24.0	− 8.0	---	154
			+35.5	−13.0	25	---
			+53.5	−23.0	31	---
			+69.5	−27.0	---	93
24	11 47	(3)	−53.0	+11.5	---	62
			−47.5	−25.0	---	62
			−37.5	−10.0	---	123
			−22.0	−27.0	25	---
			+ 6.0	+ 3.5	6	---
			+36.0	− 8.0	---	154
			+48.0	−13.0	15	---
			+49.5	− 4.5	---	31
			+78.0	−27.0	---	216
26	11 58	(3)	−63.5	−20.0	154	---
			−45.5	−20.5	---	185
			−26.0	+17.0	---	15
			−15.0	−25.0	---	108
			− 7.0	−10.5	77	---
			+17.0	− 9.5	---	139
			+64.0	− 9.0	---	154
27	11 49	(3)	−49.0	−20.0	185	---
			−32.0	−20.0	---	123
			−13.0	+17.0	---	9
			− 7.0	−25.0	---	31
			+ 7.5	−10.5	93	---
			+31.0	− 9.5	---	108
			+85.0	− 9.5	154	---
28	11 46	(3)	−37.0	−19.5	185	---
			−16.0	−19.0	---	108
			+11.0	−10.5	62	---
			+44.0	− 9.5	---	93
30	12 33	(3)	− 9.5	−19.5	185	---
			+13.5	−19.0	---	123
			+49.0	−11.0	46	---
June 1	11 47	(3)	−87.0	+17.0	---	463
			+18.0	−20.0	---	139

3 Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1927	h m		°	°		
June 1	11 47	(3)	+39. 5	−19. 0	93	---
			+62. 0	−11. 0	---	46
2	11 47	(3)	−72. 0	+17. 0	---	617
			+30. 5	−19. 5	123	---
			+52. 0	−19. 0	62	---
5	11 44	(3)	−32. 0	+17. 5	---	648
			+70. 0	19. 5		93
6	11 57	(3)	−41. 0	+14. 5	---	62
			−38. 5	+20. 5	25	---
			−19. 5	+17. 0	---	679
8	11 50	(3)	−44. 5	+11. 5	9	---
			−14. 0	+16. 0	---	93
			+ 6. 0	+17. 0	---	772
9	11 46	(3)	+ 1. 0	+15. 5	---	62
			+19. 0	+17. 0	---	833
			+25. 0	−19. 5	---	77
10	13 55	(3)	+17. 5	+16. 0	---	40
			+32. 5	+17. 5	---	741
			+39. 5	−19. 0	---	123
11	11 32	(3)	−75. 0	− 9. 0	77	---
			−14. 5	−20. 5	6	---
			+29. 0	+15. 0	31	---
			+45. 0	+17. 0	---	586
			+51. 5	−19. 5	---	62
12	11 33	(3)	−62. 0	− 9. 0	108	---
			−46. 0	−25. 5	15	---
			0. 0	−20. 0	6	---
			+42. 0	+15. 0	15	---
			+59. 0	+17. 0	---	494
			+66. 0	−19. 0	19	---
13	11 46	(3)	−57. 5	−25. 0	9	---
			−48. 0	− 9. 0	77	---
			−35. 0	−26. 0	---	37
			+14. 5	−19. 5	12	---
			+73. 0	+17. 0	---	401
15	12 16	(3)	−30. 5	−25. 0	9	---
			−20. 5	− 9. 0	62	---
			− 5. 0	−25. 5	9	---
16	11 49	(3)	−85. 0	−10. 0	31	---
			−18. 0	−25. 0	15	---
			− 7. 5	− 9. 0	77	---
			+ 8. 5	−25. 5	9	---
			+50. 0	+20. 5	12	---
17	12 5	(3)	−65. 0	−11. 0	---	31
			− 4. 0	−25. 0	19	---
			+ 7. 0	− 9. 0	77	---
18	11 33	(3)	−50. 5	−10. 5	15	---
			+ 9. 0	−25. 0	25	---
			+20. 0	− 9. 0	77	---
1927	h m		°	°		
June 20	12 24	(3)	−61. 5	− 9. 0	---	93
			−23. 0	−10. 0	---	15
			−20. 0	−13. 0	---	15
			+46. 5	− 9. 0	77	---
21	11 44	(3)	−47. 5	− 9. 0	---	216
			− 8. 5	−10. 5	---	37
			+59. 5	− 9. 0	77	
22	11 39	(3)	−34. 0	− 8. 5		216
			+ 5. 0	−10. 5	---	31
			+14. 0	− 5. 5	9	
			+71. 5	− 9. 0	108	---
23	13 14	(3)	−60. 0	−14. 0	31	---
			−19. 0	− 9. 0	---	185
			+19. 0	−11. 0	---	93
			+31. 0	−28. 0	---	46
24	11 41	(3)	−49. 0	−11. 5	---	19
			− 8. 5	− 9. 0	---	185
			+32. 5	−11. 0	---	93
			+42. 5	−29. 0	---	46
25	11 42	(3)	−73. 0	−19. 5	---	123
			−72. 0	− 9. 0	---	247
			−18. 5	− 7. 5	---	31
			− 1. 0	− 9. 5	---	123
			+10. 0	− 9. 5	22	---
			+49. 0	−11. 0	---	123
			+51. 5	−29. 5	---	46
26	11 53	(3)	−75. 5	− 9. 5	62	---
			−69. 0	−10. 0	31	---
			−59. 5	−19. 5	93	---
			−59. 0	− 8. 5	---	247
			−20. 5	+21. 0	---	46
			+ 5. 0	+21. 0	---	37
			+17. 5	− 9. 0	---	62
			+61. 5	−11. 0	---	46
27	11 46	(3)	−64. 0	− 8. 5	46	---
			−45. 5	−19. 0	77	---
			−44. 5	− 8. 0	---	247
			− 7. 0	+22. 0	---	62
			+ 1. 0	+ 9. 0	---	46
			+18. 5	+22. 0	---	139
			+29. 5	− 9. 0	---	62
			+72. 0	−12. 0	31	---
28	11 46	(3)	−69. 0	−21. 0	---	154
			−31. 5	−19. 0	---	31
			−31. 0	− 8. 0	---	247
			+ 7. 5	+22. 0	---	62
			+14. 0	+ 8. 5	---	46
			+32. 0	+22. 0	---	123
			+40. 5	− 9. 0	---	62
29	11 46	(3)	−73. 5	+16. 0	---	247
			−57. 0	−21. 0	---	123
			−19. 0	−19. 0	---	46
			−18. 0	− 8. 0	---	247

[3] Greenwich publication has not been received.

1757—29——34

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1927	h m		°	°		
June 29	11 46	(3)	+21.0	+22.0	---	46
			+28.5	+ 8.0	---	15
			+45.0	+22.0	---	154
			+59.5	− 9.5	---	62
30	11 47	(3)	−73.0	+15.0	93	---
			−61.0	+16.5	---	340
			−43.0	−20.5	---	31
			− 6.0	−19.0	15	---
			− 4.5	− 8.0	---	370
			+ 0.5	−20.0	---	15
			+34.0	+22.0	---	77
			+61.0	+20.5	93	---
			+68.5	−11.0	46	---
July 1	11 47	(3)	−60.5	+15.0	93	---
			−49.0	+16.5	---	340
			− 4.0	− 9.0	---	31
			+ 9.0	− 8.0	---	432
			+46.0	+22.0	---	123
			+75.0	+21.0	62	---
2	11 50	(3)	−66.5	−10.0	15	---
			−48.0	+14.5	---	31
			−37.0	+16.0	---	370
			+22.5	− 8.0	---	463
			+32.5	+23.5	---	46
			+58.0	+22.5	---	154
3	11 58	(3)	−52.5	−10.0	15	---
			−34.0	+14.5	---	15
			−23.0	+16.0	---	432
			+35.5	− 8.0	---	494
			+44.0	+23.0	---	62
			+72.0	+22.5	---	139
4	11 47	(3)	−77.0	−11.0	---	62
			−39.0	−10.0	12	---
			−10.0	+15.5	---	370
			+49.0	− 8.0	---	463
			+59.0	+22.5	---	62
5	11 53	(3)	−63.0	−11.0	---	62
			−53.0	− 7.5	15	---
			−25.0	−10.0	12	---
			+ 4.0	+15.5	---	401
			+64.0	− 8.0	---	463
			+73.0	+22.5	---	62
7	12 10	(3)	−37.0	−10.5	31	---
			−26.5	− 7.0	15	---
			+12.5	−10.5	---	15
			+30.0	+15.0	---	432
			+62.0	+21.0	---	31
8	11 47	(3)	−72.0	−11.0	46	---
			−22.0	−12.0	15	---
			−13.5	− 8.0	---	15
			+44.0	+17.5	---	401
11	11 52	(3)	−32.0	− 7.5	15	---
			−22.0	−23.0	9	---
			+84.0	+16.0	---	309
1927	h m		°	°		
July 12	11 50	(3)	+37.0	+10.5	---	31
13	11 48	(3)	−72.5	−12.5	123	---
			+52.0	+10.5	---	19
14	11 42	(3)	−68.0	−14.0	15	---
			−59.0	−13.0	216	---
15	11 57	(3)	−71.0	−30.5	62	---
			−55.5	−14.0	12	---
			−46.5	−13.0	---	216
			−11.5	+14.0	---	46
16	11 43	(3)	−60.0	−30.5	---	15
			−32.0	−12.5	154	---
			+ 2.0	+14.5	---	77
			+50.5	−12.0	---	108
18	11 42	(3)	− 6.0	−12.5	---	185
			+27.0	+14.5	---	31
20	11 42	(3)	−63.5	+23.0	93	---
			+20.5	−11.5	93	---
			+25.0	−15.5	15	---
21	11 41	(3)	−80.0	− 9.0	309	---
			−50.0	+23.0	123	---
			−11.0	− 9.5	---	62
			+36.0	−14.5	---	93
23	11 43	(3)	−55.0	− 9.0	---	370
			−24.5	+23.0	123	---
			+17.0	− 9.5	---	93
			+24.0	+10.0	---	15
			+64.0	−15.0	---	185
24	11 44	(3)	−42.5	− 8.5	---	340
			−11.0	+23.0	108	---
			+29.5	− 9.5	---	46
			+39.0	+ 9.0	---	93
			+75.0	−19.0	12	---
25	11 52	(3)	−29.0	− 8.5	---	340
			+ 1.0	+23.0	108	---
			+42.0	− 9.0	---	93
			+52.0	+ 9.0	---	77
26	11 46	(3)	−17.0	− 9.0	---	370
			− 2.0	+14.0	---	15
			+14.0	+23.0	108	---
			+55.5	− 9.5	---	108
			+64.5	+ 9.0	---	93
27	11 50	(3)	−69.0	− 8.0	---	77
			− 2.5	− 9.5	340	---
			+13.0	+14.0	---	46
			+27.5	+23.0	77	---
			+70.0	−10.0	---	62
28	11 49	(3)	−56.0	− 8.0	31	---
			+11.0	− 9.5	309	---
			+29.5	+13.5	15	---
			+40.5	+22.5	77	---
			+70.0	−17.0	9	---

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1927	h m		°	°		
July 31	13 26	(3)	−15.0	−7.5	15	---
			+23.0	+10.5	---	46
			+52.0	−9.5	340	---
			+81.0	+22.5	---	309
Aug. 1	12 0	(3)	−67.0	−16.5	---	62
			+0.5	+13.5	15	---
			+38.0	+9.5	---	46
			+63.5	−11.0	247	---
2	11 49	(3)	−53.0	−17.5	---	93
			−34.0	−8.0	---	46
			−7.0	−17.0	---	31
			+51.0	+11.0	---	62
			+53.5	+20.5	---	31
			+78.0	−10.5	278	---
4	14 26	(3)	−26.0	−17.5	---	62
			+23.0	−17.0	---	123
			+57.0	+11.5	---	31
			+83.0	+20.0	---	247
5	11 52	(3)	−13.5	−17.5	---	46
			+34.5	−17.0	---	154
			+68.0	+11.5	15	---
6	11 36	(3)	−2.5	−18.5	---	15
			+22.5	−6.5	---	46
			+43.5	−15.0	---	62
			+50.5	−17.0	---	77
7	11 38	(3)	+12.0	−18.5	---	15
			+37.0	−6.5	---	15
			+57.5	−15.0	---	62
			+65.0	−17.5	---	93
9	12 42	(3)	−77.0	−13.5	185	---
			−66.5	−13.0	93	---
10	11 29	(3)	−62.5	−13.5	---	185
			−53.0	−12.5	---	93
11	11 39	(3)	−50.0	−13.5	---	123
			−39.5	−12.0	---	77
			−33.0	−11.5	---	31
12	11 40	(3)	−37.0	−13.5	---	93
			−27.5	−11.5	---	93
			−21.0	−10.5	---	93
13	11 34	(3)	−22.5	−13.0	---	46
			−13.0	−11.0	---	46
			−8.0	−10.0	---	216
15	11 40	(3)	−53.5	−18.5	---	123
			−21.0	−7.5	---	15
			+18.5	−10.5	---	648
16	11 44	(3)	−63.0	+11.0	---	93
			−57.5	+10.0	---	62
			−38.0	−18.5	---	247
			+32.0	−11.0	---	741

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1927	h m		°	°		
Aug. 17	11 45	(3)	−85.0	−10.5	309	---
			−50.5	+10.5	---	31
			−42.5	+10.0	31	---
			−24.0	−18.5	---	154
			+0.5	−8.0	---	93
			+46.0	−11.0	---	864
19	11 47	(3)	−58.0	−10.5	370	---
			−25.0	+10.5	123	---
			−18.0	+10.0	9	---
			−13.5	+10.5	19	---
			+5.5	−17.5	93	---
			+27.5	−8.0	---	62
			+59.0	−13.0	---	62
			+72.0	−10.5	---	926
21	11 39	(3)	−55.0	+16.5	31	---
			−31.0	−11.0	247	---
			+9.0	+10.5	---	154
			+32.0	−17.0	108	---
23	12 10	(3)	−66.0	−18.0	---	309
			−4.0	−10.5	278	---
			+36.0	+11.0	---	370
			+59.0	−17.5	93	---
24	11 47	(3)	−55.5	−17.5	---	185
			−52.0	−18.0	216	---
			+9.5	−10.5	278	---
			+49.5	+10.5	---	370
			+73.0	−17.5	93	---
29	11 31	(3)	−79.0	+7.0	---	31
			−48.0	−18.0	---	62
			+12.5	−18.0	---	494
			+77.0	−10.0	---	216
30	11 41	(3)	−72.0	−14.5	15	---
			−38.0	−17.0	---	31
			−34.0	−18.0	---	46
			+27.0	−17.5	---	309
31	11 40	(3)	−62.0	−14.5	---	216
			−24.0	−17.5	---	93
			+39.0	−17.5	---	278
Sept. 2	11 31	(3)	−38.0	−16.5	---	108
			−31.5	−14.5	---	93
			+3.5	−17.0	---	123
			+67.0	−17.5	---	278
3	11 38	(3)	−25.0	−16.5	---	108
			−17.5	−14.5	---	77
			+16.0	−17.5	---	123
4	11 40	(3)	−75.0	−12.0	---	216
			−11.5	−16.5	---	77
			−3.5	−14.5	---	62
			+29.5	−17.5	---	139
5	11 42	(3)	−61.5	−11.5	---	216
			+2.0	−16.0	---	77
			+10.0	−14.5	62	---
			+43.0	−17.5	---	93

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1927	h m		°	°		
Sept. 6	11 43	(3)	−77.5	+19.5	---	62
			−47.5	−11.0	---	185
			+17.0	−17.5	---	46
			+23.0	−15.0	---	62
			+53.5	−18.5	77	---
7	11 44	(3)	−64.0	+20.0	---	15
			−33.5	−11.0	---	185
			+28.0	−16.0	---	31
			+36.5	−14.5	---	62
			+67.5	−18.0	77	---
11	11 35	(3)	−37.0	−20.0	---	216
			−34.0	−12.0	---	31
			−24.0	− 8.5	---	62
			+18.5	−14.0	---	46
			+19.5	−10.0	154	---
			+48.0	+17.0	---	62
12	11 44	(3)	−71.0	−12.0	---	123
			−22.5	−20.0	---	401
			−17.5	−12.0	---	108
			+31.5	−17.0	---	31
			+33.0	−10.5	123	---
13	11 52	(3)	−77.0	+21.5	---	216
			−56.5	−11.0	---	154
			− 8.0	−20.0	---	617
			− 4.5	−12.0	---	216
			+47.0	−10.0	123	---
14	12 5	(3)	−83.0	−10.0	154	---
			−63.0	+21.5	---	154
			−43.5	−11.5	---	108
			−16.5	−19.5	---	15
			+ 5.0	−20.0	---	710
			+ 9.5	−12.0	---	370
			+60.5	−10.0	123	---
15	11 46	(3)	−83.0	−13.5	309	---
			−69.5	−10.0	93	---
			−55.0	+23.0	---	31
			−50.0	+21.0	---	154
			−34.0	−12.5	---	62
			−26.5	−11.0	---	46
			− 0.5	−19.5	---	15
			+10.5	+25.0	---	15
			+17.5	−20.0	---	710
			+24.0	−12.0	---	556
			+74.0	−10.0	123	---
16	12 9	(3)	−69.0	−14.5	154	---
			−57.0	−10.0	62	---
			−44.0	+25.0	15	---
			−38.0	+21.0	---	139
			−20.0	−13.0	31	---
			−12.0	−10.0	---	15
			+ 8.0	−14.0	---	31
			+14.0	−19.5	---	31
			+31.0	−20.0	---	741
			+37.0	−12.0	---	648
			+82.0	+17.0	---	154
1927	h m		°	°		
Sept. 18	11 35	(3)	−42.0	−14.0	123	---
			−29.0	−10.0	15	---
			−11.0	+21.0	---	154
			+ 9.0	−11.0	---	46
			+15.0	−10.5	---	15
			+51.0	−22.0	---	278
			+62.0	−19.0	370	---
			+64.0	−12.0	---	710
20	11 46	(3)	−73.5	+14.5	---	31
			−63.5	+14.0	15	---
			−57.0	−13.5	---	31
			−23.0	+11.0	---	31
			−17.0	−14.0	93	---
			+12.5	+21.5	---	154
			+34.5	−11.5	---	62
			+76.0	−22.0	463	---
21	11 46	(3)	−50.0	+14.0	6	---
			−41.0	−13.0	3	---
			− 4.0	−13.0	---	123
			+28.0	+21.5	---	139
22	11 59	(3)	−73.0	−19.0	185	---
			−37.0	+14.0	9	---
			− 3.0	+10.5	---	31
			+10.5	−13.0	46	---
			+19.0	+21.0	---	62
			+41.0	+21.5	123	---
			+62.0	−11.5	15	---
23	11 47	(3)	−59.5	−19.0	185	---
			+10.0	+10.5	---	62
			+23.0	−13.0	46	---
			+32.5	−17.0	---	31
			+33.0	+21.0	---	93
			+53.5	+21.5	123	---
24	11 43	(3)	−46.0	−19.0	216	---
			+13.5	+ 5.0	---	31
			+24.0	+10.5	---	62
			+37.0	−12.5	---	31
			+46.0	−17.0	---	108
			+46.5	+21.0	---	123
			+68.0	+21.0	123	---
25	11 44	(3)	−53.5	+18.5	15	---
			−32.5	−18.5	185	---
			+29.0	+ 6.0	15	---
			+37.5	+11.0	---	62
			+56.0	−17.5	---	108
			+60.0	+21.0	---	154
			+62.0	−15.0	93	---
			+82.0	+21.0	108	---
26	11 43	(3)	−70.0	−12.5	6	---
			−39.0	+17.5	19	---
			−19.0	−19.0	170	---
			+42.5	+ 6.0	15	---
			+51.0	+10.5	---	62
			+69.0	−18.0	---	185
			+69.0	+21.0	---	108
			+75.0	−15.0	---	93

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1927	h m		°	°		
Sept. 27	11 46	(3)	−56.0	−11.5	---	31
			−32.0	−19.5	---	31
			−25.0	+18.0	15	---
			− 6.0	−18.5	---	185
			+57.0	+ 6.0	6	---
			+66.5	+10.5	---	46
28	11 34	(3)	−42.0	−12.5	---	31
			−41.5	−34.0	3	---
			−12.0	+18.0	9	---
			+ 7.5	−18.5	---	185
29	12 9	(3)	−66.0	+21.0	---	31
			−28.0	−33.0	6	---
			−22.5	−12.0	---	31
			+19.5	−18.5	---	185
30	11 45	(3)	−49.5	+20.5	---	31
			+32.0	−18.5	---	185
Oct. 1	11 46	(3)	−76.0	+16.0	62	---
			−73.0	−10.0	77	---
			+46.0	−18.5	---	247
2	11 45	(3)	−71.0	+15.5	123	---
			−61.5	+16.0	108	---
			−59.0	− 9.5	77	---
			+59.0	−18.5	---	185
4	11 47	(3)	−82.0	−11.0	---	309
			−60.0	+19.0	---	154
			−52.0	+15.5	---	154
			−32.0	−10.0	37	---
			+22.5	+10.0	---	40
5	11 46	(3)	−78.0	−18.5	---	185
			−67.5	−11.0	---	185
			−49.0	+19.0	---	170
			−40.0	+15.5	---	62
			−19.0	−10.0	40	---
			+19.5	+20.5	---	31
			+37.5	+ 9.5	---	31
6	11 46	(3)	−63.5	−18.5	---	216
			−55.0	−11.5	---	231
			−37.0	+19.0	---	185
			−31.0	+17.5	31	---
			−27.5	+15.0	---	77
			− 6.5	−10.0	31	---
			+51.5	+ 8.5	15	---
7	11 46	(3)	−69.5	+11.0	6	---
			−52.0	−18.5	---	185
			−42.0	−11.5	---	123
			−22.5	+19.5	---	185
			−17.5	+17.5	6	---
			−12.5	+16.0	---	62
			+ 8.0	− 9.5	31	---
			+12.0	− 9.5	---	12
			+15.0	− 9.5	---	22
			+62.5	+10.0	---	31
1927	h m		°	°		
Oct. 9	12 50	(3)	−67.0	−10.0	---	123
			−48.5	+18.0	---	31
			−25.5	−19.0	---	123
			−21.5	−21.0	---	6
			−11.0	−12.5	---	309
			+ 4.0	+19.5	---	185
			+ 9.0	+17.5	---	9
			+14.0	+15.5	31	---
			+34.5	−10.0	22	---
			+40.5	− 9.5	---	31
			+46.0	− 9.5	---	46
10	11 46	(3)	−83.0	+21.0	247	---
			−54.0	− 9.5	---	216
			−12.0	−19.0	---	123
			− 9.0	−20.5	---	15
			+ 2.5	−12.5	---	278
			+19.0	+18.0	---	154
			+60.5	− 9.5	46	---
11	11 49	(3)	−71.5	+21.0	139	---
			−39.5	− 9.5	---	185
			+ 0.5	−20.0	---	139
			+15.5	−12.5	---	216
			+31.0	+18.0	---	93
			+72.0	−10.0	---	93
13	11 43	(3)	−45.5	+21.0	108	---
			−20.0	−12.0	---	62
			−13.0	−11.0	---	123
			− 9.0	− 9.0	108	---
			+26.0	−20.0	---	123
			+43.5	−12.5	---	154
			+54.0	+20.0	---	46
14	11 44	(3)	−32.0	+21.0	93	---
			−22.5	−20.0	6	---
			+ 0.5	−11.0	---	93
			+ 5.5	− 9.0	108	---
			+39.5	−20.0	---	93
			+53.5	−12.0	---	46
			+62.0	−12.5	123	---
			+70.5	+18.0	46	---
15	11 48	(3)	−19.0	+21.0	108	---
			+11.0	−11.0	---	62
			+18.0	− 9.0	---	154
			+51.0	−20.0	---	139
			+73.0	−13.0	77	---
16	11 46	(3)	−85.0	−10.5	---	123
			−79.0	− 7.0	93	---
			− 5.5	+21.0	123	---
			+26.0	−10.5	---	77
			+31.5	− 9.0	---	108
			+65.0	−20.0	---	93
17	14 2	(3)	−79.0	+11.0	62	---
			−64.0	−10.5	---	139
			−63.0	− 7.0	31	---
			+ 9.5	+21.0	123	---
			+41.5	−11.0	---	93
			+48.0	− 9.0	---	93
			+82.0	−20.0	108	---

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1927	h m		°	°		
Oct. 20	13 9	(3)	−65.0	−20.0	185	---
			−25.0	−11.0	---	185
			−22.0	− 8.0	31	---
			+48.0	+20.0	62	---
21	11 44	(3)	−53.0	−19.0	---	216
			−15.0	−10.5	---	77
			− 9.5	− 8.0	15	---
			− 9.0	−11.0	62	---
			+13.5	− 7.0	---	62
			+32.5	−29.5	---	46
			+60.0	+20.0	108	---
22	11 44	(3)	−39.5	−19.0	---	185
			− 1.0	−10.5	---	77
			+ 4.5	−11.0	31	---
			+19.5	− 7.5	---	6
			+26.5	− 7.0	---	62
			+39.5	− 4.5	93	---
			+46.0	−30.0	---	31
			+49.0	−10.0	---	46
			+72.5	+20.0	108	---
23	13 19	(3)	−27.0	−20.0	---	170
			+12.0	−10.5	---	31
			+19.0	−11.0	62	---
			+40.0	− 7.5	---	154
			+46.0	− 5.0	---	154
			+61.5	−10.5	---	123
24	11 45	(3)	−83.0	+21.0	154	---
			−14.0	−19.5	---	185
			+10.0	−18.5	---	31
			+25.0	−11.0	---	15
			+30.5	−11.0	46	---
			+52.0	− 7.0	---	185
			+60.0	− 6.5	216	---
			+73.5	−11.0	---	139
25	11 45	(3)	−70.0	+21.5	93	---
			− 0.5	−19.5	---	154
			+43.0	−11.0	31	---
			+66.5	− 7.5	---	108
			+74.0	− 7.0	216	---
26	11 45	(3)	−58.0	+22.0	46	---
			+12.5	−19.5	---	154
			+58.0	−11.0	62	---
			+79.0	− 6.0	31	---
27	11 45	(3)	−24.5	−17.5	15	---
			−11.0	+17.0	15	---
			+25.5	−19.5	---	93
			+71.0	−11.5	62	---
28	11 49	(3)	+39.0	−19.5	---	62
29	11 46	(3)	−82.0	+16.0	62	---
			+50.5	−19.5	---	62
30	11 45	(3)	−82.5	+18.5	93	---
			−69.0	+16.0	---	108
			+ 8.5	+14.5	---	31
1927	h m		°	°		
Oct. 30	11 45	(3)	+10.5	+10.0	---	46
			+14.0	−16.5	---	22
			+18.5	−17.5	---	12
			+64.0	−19.5	---	62
31	11 48	(3)	−69.5	+18.5	139	---
			−56.0	+15.5	---	93
			+21.5	+16.0	---	62
			+24.0	+10.0	---	46
			+30.5	−17.0	---	93
			+81.0	−19.5	---	62
Nov. 1	11 45	(3)	−57.0	+18.0	---	139
			−45.0	−12.0	---	77
			−41.0	+15.5	---	62
			+30.0	+17.5	---	62
			+35.0	+15.0	---	46
			+38.0	+10.5	---	108
			+43.5	−17.0	---	31
2	14 36	(3)	−42.0	+18.0	108	---
			−29.5	−12.0	---	62
			−26.0	+15.5	6	---
			+48.0	+17.5	---	31
			+54.5	+10.5	---	62
4	14 14	(3)	−16.0	+17.5	---	77
			− 1.5	+17.0	---	46
			+30.0	+21.5	---	15
5	11 38	(3)	− 2.0	+18.0	---	77
			+11.5	+17.0	---	31
			+27.0	+18.0	15	---
			+43.0	+22.0	---	62
6	11 43	(3)	−55.5	−10.0	---	31
			+13.0	+18.0	---	46
			+25.5	+16.0	---	46
			+58.0	+21.0	---	62
7	11 45	(3)	−39.5	−10.0	---	31
			+24.5	+18.5	---	31
			+70.5	+21.0	---	31
9	11 54	(3)	−82.0	− 8.0	---	278
			−71.0	+14.5	62	---
			−30.5	+ 6.0	---	31
			−15.0	−11.0	---	154
			− 9.5	−10.0	---	278
			+32.0	−11.5	---	46
11	11 41	(3)	−68.0	+ 6.5	---	93
			−64.0	+ 7.5	---	108
			−59.0	+ 7.0	---	93
			−59.0	− 7.0	---	93
			−54.0	− 7.5	216	---
			−53.5	− 9.0	---	77
			−27.5	−11.5	---	31
			− 3.0	+ 7.5	---	15
			+12.0	−10.0	---	278
			+17.5	−10.0	---	617
			+58.0	−11.5	---	31

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1927	h m		°	°		
Nov. 12	11 51	[3]	−57.0	+6.5	---	93
			−47.5	+8.5	---	93
			−47.5	−6.0	---	46
			−45.0	+5.0	31	---
			−40.5	−7.5	---	278
			−11.0	−12.0	6	---
			+9.5	+8.0	---	31
			+24.0	−10.5	---	278
			+31.0	−10.0	---	679
13	11 45	[3]	−42.5	+6.5	---	93
			−37.5	+8.5	---	46
			−31.5	+5.0	---	46
			−31.0	−7.0	---	77
			−30.0	+9.5	---	31
			−27.5	−7.5	216	---
			−24.5	−9.0	31	---
			+38.5	−9.5	---	340
			+42.0	−8.5	---	185
			+47.0	−10.0	---	370
14	11 46	[3]	−30.0	+5.5	31	---
			−22.5	+8.5	---	77
			−18.5	+9.0	---	46
			−17.0	−7.5	---	77
			−13.0	−7.5	185	---
			−9.5	−9.0	---	6
			+42.5	−12.0	6	---
			+53.0	−9.5	---	340
			+60.0	−10.0	---	432
15	11 45	[3]	−17.0	+5.5	15	---
			−9.5	+8.5	---	154
			−5.0	+9.0	---	62
			−3.5	−7.0	---	108
			+0.5	−7.5	216	---
			+55.5	−10.0	---	247
			+69.0	−8.0	46	---
			+73.0	−10.0	---	340
16	12 11	[3]	−77.0	+11.5	---	46
			−72.5	+10.5	---	154
			−29.0	−20.5	---	37
			−2.0	+5.5	22	---
			+4.0	+8.5	---	77
			+8.0	+9.0	---	62
			+12.5	−7.5	---	340
			+70.0	+11.0	62	---
			+80.0	−10.5	---	309
18	12 24	[3]	−76.0	−13.5	31	---
			−48.5	+10.5	---	62
			−43.0	+11.0	---	154
			−0.5	−20.5	62	---
			+24.5	+5.5	9	---
			+31.5	+8.0	---	46
			+36.0	+9.0	---	31
			+40.0	−8.0	---	278
			+40.5	−10.5	62	---
			+75.0	−19.0	77	---
19	11 42	[3]	−63.0	−15.5	---	123
			−36.0	+11.0	---	62

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic		Area	
			Diff. Long.	Lat.	Spot	Group
1927	h m		°	°		
Nov. 19	11 42	[3]	−30.5	+10.5	---	231
			−12.0	−6.5	---	62
			+11.5	−20.5	46	---
			+52.5	−8.0	---	216
20	11 43	[3]	−51.5	−13.5	---	216
			−21.0	+10.0	---	15
			−17.5	+10.5	---	139
			+3.0	−7.5	---	15
			+24.0	−20.5	---	37
			+27.0	+13.0	---	15
			+65.0	−8.0	---	154
22	11 36	[3]	−25.5	−14.0	---	185
			+7.5	+10.5	---	15
			+11.0	+10.5	---	123
			+31.0	−7.5	---	108
			+50.5	−20.0	40	---
			+56.0	+13.0	15	---
23	11 29	[3]	−26.0	−14.5	---	123
			−23.0	−17.5	---	93
			−14.0	−14.0	---	108
			−10.5	−15.0	31	---
			+21.0	+12.0	---	62
			+23.5	+10.5	---	108
			+40.0	−7.0	62	---
			+48.5	−7.5	46	---
			+63.5	−20.0	15	---
24	11 54	[3]	−17.5	+17.5	---	15
			−13.5	−15.0	---	170
			−13.0	−18.0	---	31
			−8.0	−17.5	---	170
			−0.5	−15.0	---	46
			+3.0	−15.0	31	---
			+33.5	+12.0	---	31
			+37.5	+10.5	---	123
			+53.5	−6.5	---	77
			+57.5	−7.0	9	---
			+62.0	−7.5	31	---
26	11 43	[3]	−74.0	+5.0	6	---
			−52.5	−20.0	9	---
			−45.0	−16.5	15	---
			+10.0	−18.0	139	---
			+16.0	−17.5	---	340
			+27.0	−15.0	---	46
			+30.5	−15.0	31	---
			+67.0	+11.0	123	---
			+80.0	−7.0	62	---
27	11 31	[3]	−62.0	+4.5	31	---
			−40.0	−20.0	6	---
			+22.0	−18.0	123	---
			+26.5	−16.5	---	216
			+31.0	−18.0	---	247
			+40.5	−15.0	---	15
			+44.0	−15.0	9	---
			+79.0	+10.5	93	---
29	12 43	[3]	−34.5	+5.0	6	---
			−0.5	−14.5	---	62

[3] Greenwich publication has not been received.

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1927	h m		°	°		
Nov. 29	12 43	(3)	+48.5	−18.0	108	---
			+54.0	−16.5	---	278
			+59.5	−17.5	370	---
30	11 21	(3)	+12.5	−14.5	---	77
			+30.0	−10.0	15	---
			+61.0	−18.0	93	---
			+66.0	−16.5	---	247
			+72.0	−17.5	463	---
Dec. 1	11 51	(3)	−37.0	+13.5	6	---
			−33.5	−11.0	15	---
			+25.0	−15.5	---	77
			+74.0	−18.0	---	93
			+85.0	−16.0	---	463
5	11 42	(3)	−83.0	+18.5	62	---
			−42.0	−11.5	---	31
			−14.5	−22.0	---	108
6	11 42	(3)	−75.0	−10.5	---	154
			−74.0	+18.5	62	---
			−66.5	+19.0	62	---
			−29.0	−12.0	---	62
			− 5.0	−21.5	---	46
			+ 1.5	−21.0	---	62
8	11 36	(3)	−77.0	+ 4.5	123	---
			−49.5	−11.0	---	62
			−47.5	+19.0	31	---
			−42.5	− 9.5	---	77
			−37.5	+19.5	46	---
			− 3.0	−11.5	62	---
			+ 2.0	−11.0	---	62
			+ 6.0	− 9.5	46	---
			+22.0	−22.0	31	---
			+28.5	−21.5	31	---
9	11 41	(3)	−64.5	+ 5.0	139	---
			−37.5	−10.5	---	46
			−34.0	+19.5	31	---
			−29.5	− 8.5	---	46
			−25.0	+20.0	46	---
			+ 9.0	−11.5	---	123
			+14.5	−10.0	---	170
			+44.5	−11.0	---	37
			+48.0	−10.0	31	---
10	11 41	(3)	−50.5	+ 5.0	139	---
			−23.0	−10.5	---	31
			−17.5	− 8.5	---	46
			+21.5	−12.0	---	247
			+26.5	−13.0	---	46
			+29.0	− 9.5	---	123
			+55.0	−19.5	31	---
			+58.5	−12.0	46	---
14	11 37	(3)	+ 2.5	+ 5.0	---	139
			+14.5	−15.0	6	---
			+39.0	− 9.0	25	---
			+73.0	−14.5	---	216
			+77.0	−12.0	---	62
17	11 39	(3)	+44.0	+5.0	---	77

Date	Eastern Standard Civil Time	Greenwich Group No.	Heliographic Diff. Long.	Heliographic Lat.	Area Spot	Area Group
1927	h m		°	°		
Dec. 18	11 51	(3)	+58.0	+ 5.0	---	62
19	11 50	(3)	−14.0	+15.5	15	---
			−11.0	+15.0	15	---
			+70.0	+ 5.0	---	62
20	11 42	(3)	− 2.5	+15.5	---	15
			+ 0.5	+15.0	---	31
21	14 12	(3)	+14.0	+16.0	---	62
			+17.5	+15.0	---	31
22	13 10	(3)	+27.5	+16.0	---	15
			+30.0	+14.5	---	46
23	11 55	(3)	−21.5	+19.5	---	9
			+13.0	−11.5	---	46
			+13.5	+19.5	---	15
			+24.0	−13.0	---	31
			+40.0	+16.5	---	31
			+42.0	+15.0	---	77
			+46.0	+14.0	15	---
24	11 45	(3)	−34.5	+10.5	---	46
			− 9.0	+20.5	12	---
			− 4.5	+19.0	6	---
			+10.5	−13.0	---	62
			+23.5	−11.0	46	---
			+29.5	−11.5	---	37
			+53.0	+17.0	---	46
			+56.0	+15.0	---	77
			+60.0	+14.0	15	---
25	11 46	(3)	−25.0	+14.0	---	93
			−20.5	+11.0	---	31
			+ 6.0	+20.0	---	6
			+ 9.5	+19.0	---	9
			+22.0	−12.5	---	31
			+27.0	−11.5	---	46
			+37.5	−11.5	---	46
			+43.0	−11.5	---	77
26	11 42	(3)	−14.0	+14.5	---	93
			− 9.5	+13.0	---	31
			− 7.0	+13.0	108	---
			− 6.0	+10.0	9	---
			+35.0	−12.5	---	31
			+40.0	−11.0	62	---
			+49.5	−11.5	37	---
			+57.5	−11.5	---	62
27	11 43	(3)	−72.5	−15.0	139	---
			− 0.5	+14.5	---	93
			+ 3.5	+12.5	---	77
			+ 8.0	+12.5	154	---
			+54.0	−11.0	62	---
28	11 38	(3)	−83.0	− 9.0	216	---
			−70.0	− 5.0	46	---
			−58.5	−15.5	139	---
			+16.0	+15.5	---	31
			+17.0	+13.0	---	93
			+22.0	+12.5	185	---
			+65.0	−11.0	62	---

[3] Greenwich publication has not been received.

GENERAL VIEW OF SAN DIEGO STATION

Appendix

WORLD LONGITUDE OPERATION

OF

1926

RESULTS OF OBSERVATIONS

AT

SAN DIEGO AND WASHINGTON

By

F. B. LITTELL, J. C. HAMMOND, C. B. WATTS, and P. SOLLENBERGER

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REPRODUCED BY PERMISSION OF THE SERVICE GEOGRAPHIQUE DE L'ARMÉE DE FRANCE

WORLD LONGITUDE OPERATION OF 1926 AT SAN DIEGO AND WASHINGTON

The proposal to have a world-wide series of determinations of differences of longitude by the use of radio signals was made by General Ferrié in 1919 and had been the subject of a number of conferences from that time until it was carried into effect in 1926. In the meantime the proposal had met with the approval of the International Astronomical Union at its meeting in Rome in 1922 and of the International Geophysical Union which met at the same time and place. As a result of their action a mixed commission was formed to further consider the undertaking. The matter was again considered at the meeting of the International Geophysical Union in Madrid in 1924, and at the meeting of the International Astronomical Union in Cambridge in 1925 the following recommendations were adopted:

1. That the observatories or astronomical stations taking part in the operations should be divided into two groups. The first would include a small number of observatories either constituting the fundamental polygon or else obviously of primary importance (Greenwich, Paris, Washington, etc.); whereas the second group would contain observatories or stations desiring only single linkage with one of the observatories of Group I or else vertex positions on secondary polygons.

2. That the observatories of the fundamental polygon should not be definitely named in advance but be chosen after the preliminary operations from those which have been able to work under the most favorable conditions.

3. That the instruments used in the interlinked observatories be, so far as possible, of the same type; the observatories of the first group to be provided with impersonal micrometers for their meridian instruments (but not necessarily mechanically driven); and the W-T receivers to be of self-recording pattern.

4. That, in principle, circumzenithal stars between 20° and 25° North and South be observed, but that others, particularly for astrolabe observations, be not excluded; and that no special catalogue be compiled, but that the American Ephemerides with corrections be used so far as possible.

5. That, so far as possible, only first-class timekeepers be employed whose constancy of rate can be relied upon over protracted periods.

6. That the main signal-transmitting W-T stations be Annapolis, Bordeaux, Honolulu (Pearl Harbor), and Saigon, the addition of other stations when needed, however, not being excluded (sufficient notice being, of course, given).

7. That the cooperating observatories should organize their program themselves and directly between themselves in all that concerns their interlinking. The total list of observatories of the two groups, as well as the names of signal-emitting stations, times, and other details of signals should be circularized to all concerned at the earliest possible date.

8. That the W-T signals be of such a type as the "scientific signals," for instance, which allows of ear coincidence comparison, as well as recording.

9. That the operations shall extend over a period of two months, beginning October 1, but being preceded by several days of experimental transmission.

10. That each nation shall bear the totality of expenses involved in their participation, including the transmission W-T signals by the stations belonging to them.

11. That the Astronomer Royal be requested to take the necessary steps with the governments of the British Dominions, colonies, and possessions to assure the cooperation of observatories therein situated.

The originally selected stations for the primary round-the-world polygon were Algiers, San Diego, and Shanghai, selected as being nearly equally spaced in longitude and at nearly the same latitude. Many other stations were also designated as primary, as, for example, Greenwich, Paris, and Washington. By using all the available stations it is possible to make a number of independent as well as interrelated round-the-world combinations.

In addition to the primary stations there were many secondary stations, sometimes connected with only one of the primary stations, but usually linked up with several.

The total number of stations reported through the commission of the International Astronomical Union is 41, and, in addition, it is known that there are some stations not yet reported. The stations are well scattered over the world and represent 25 different countries.

The stations for emitting the radio signals which were received at San Diego or Washington and the schedule of signals are given in the Table I. (See also Bulletin Horaire No. 27, page 197.) In addition to the signals listed in the Bulletin Horaire, Chapultepec and Malabar have been listed as their signals were recorded at San Diego.

TABLE I.—*List of Radio Longitude Signals Received at San Diego or Washington*

Designation	G. C. T.	Emitting Station	Kind of Signal	Wave Length in Meters
	h m h m			
C	0 55– 1 0	Chapultepec	American	37
1	2 55– 3 0	Annapolis	American	17, 145
2	3 10– 3 15	Annapolis	Rhythmic	17, 145
3	3 20– 3 25	Bellevue	Rhythmic	25
4	3 20– 3 25	Bellevue	Rhythmic	75
5	3 30– 3 35	Honolulu	Rhythmic	11, 500
6	3 40– 3 45	Honolulu	Rhythmic	37
7	7 56– 8 0	Bordeaux	International	18, 900
8	7 56– 8 0	Eiffel Tower	International	32
9	8 1– 8 6	Bordeaux	Rhythmic	18, 900
10	8 1– 8 6	Eiffel Tower	Rhythmic	32
11	9 26– 9 30	Eiffel Tower	International	2, 650
12	9 31– 9 36	Eiffel Tower	Rhythmic	2, 650
13	10 10–10 15	Annapolis	Rhythmic	17, 145
14	10 20–10 25	Bellevue	Rhythmic	25
15	10 20–10 25	Bellevue	Rhythmic	75
16	10 30–10 35	Honolulu	Rhythmic	11, 500
17	10 40–10 45	Honolulu	Rhythmic	37
M	10 40–10 45	Malabar	Rhythmic	15, 600
18	11 30–11 35	Saigon	Rhythmic	25
19	11 30–11 35	Saigon	Rhythmic	15, 800
20	12 1–12 6	Nauen	Rhythmic	18, 000
21	16 55–17 0	Annapolis	American	17, 145
22	19 0–19 5	Saigon	Rhythmic	25
23	19 0–19 5	Saigon	Rhythmic	15, 800
24	19 56–20 0	Bordeaux	International	18, 900
25	19 56–20 0	Eiffel Tower	Rhythmic	32
26	20 1–20 6	Bordeaux	Rhythmic	18, 900
27	20 1–20 6	Eiffel Tower	Rhythmic	32
28	20 10–20 15	Annapolis	Rhythmic	17, 145
29	20 20–20 25	Bellevue	Rhythmic	25
30	20 20–20 25	Bellevue	Rhythmic	75
31	20 30–20 35	Honolulu	Rhythmic	11, 500
32	20 40–20 45	Honolulu	Rhythmic	37
33	22 26–22 30	Eiffel Tower	International	2, 650
34	22 31–22 36	Eiffel Tower	Rhythmic	2, 650

The American signals consisted of ticks spaced 1 mean time second apart and continuing for five minutes, omitting the 29th, 55th, 56th, 57th, 58th, and 59th tick of each minute and in addition the 50th, 51st, 52nd, 53rd, 54th of the last minute. Counting the omitted ticks, there were 301 ticks in the series.

The regular rhythmic signals consisted of ticks spaced $^{60}/_{61}$ of a mean time second apart and the 1st, 62nd, 123rd, 184th, 205th, and 306th ticks were elongated. There were 306 ticks in each series.

The rhythmic signals from Honolulu consisted of ticks spaced approximately $^{60}/_{61}$ of a mean time second apart, the 60th, 120th, 180th, 240th, and 300th being omitted. Counting the omitted ticks, there were intended to be 306 ticks in a series, but often there was an extra tick, sometimes more than one. The 306th tick has been considered the end tick for reference.

The rhythmic signals from Saigon consisted of ticks spaced approximately $^{60}/_{61}$ of a mean time second apart and the 60th, 120th, 180th, and 240th were elongated. There were 300 ticks in the series.

The rhythmic signals from Malabar were spaced $^{60}/_{61}$ of a sidereal second apart and the 60th, 120th, 180th, 240th, and 300th were omitted. Counting the omitted ticks, there were 301 ticks in a series.

The Naval Observatory planned to participate in the work by occupying the astronomical stations at Washington, D. C., and San Diego, Calif., by controlling the sending of the radio signals from the naval radio stations at Annapolis and Bellevue near Washington and by making the arrangements for sending the radio signals from the naval radio station at Pearl Harbor, Honolulu.

The personnel assigned to the work was as follows: At San Diego for the astronomical work, Capt. F. B. Littell (Math.), United States Navy, and Astronomer J. C. Hammond; and for the radio work, Associate Astronomer P. Sollenberger and Chief Radioman B. B. Moran, United States Navy; at Washington for the astronomical work, Associate Astronomer C. B. Watts; and for the radio work, Assistant Astronomer G. M. Raynsford, Junior Astronomer J. E. Willis, Junior Astronomer G. C. Whittaker, and Mr. C. L. Frederick.

At San Diego there was also a representative of the French Government, Col. Ch. Mailles of the Geographic Service of the Army, who made observations for time using a prismatic astrolabe. There was assigned to assist him and to act as interpreter for him Aviation Chief Carpenter's Mate P. N. Proteau, United States Navy.

At San Diego the station was located on North Island in the grounds of the naval air station. Capt. S. H. R. Doyle, United States Navy, commandant, and his staff cooperated cordially in forwarding the work, and the preliminary preparations were carefully executed.

In anticipation of the work, which had at one time been planned for 1923, a small observer's house, with a concrete-lined vault beneath for the astronomical clock, and piers for the transit instrument, the meridian mark lens, and the meridian mark had been constructed at that time and were in excellent condition for use. It was planned to have the transit instrument out in the open air. Its pier was about 20 feet east of the observer's room. This pier has been marked by a brass plate suitably inscribed to insure its preservation for use in future determinations

at the same point. A shelter from rain and sunshine made up in sections, easily removable each night before observing, was provided. A few feet north of the instrument pier was a concrete pier for the meridian mark lens, and about 160 feet north of that was a concrete pier for the meridian mark and the personal equation apparatus. A pier for the astrolabe was built 35 feet east of the transit pier, and this was protected from the wind by a high board inclosure without any roof.

At the Naval Observatory in Washington the Prin transit was located in one of the small louver houses built for the Washington-Paris longitude work of 1913–14.

THE CLOCKS AND CLOCK VAULTS

At San Diego the clock, Riefler No. 144, was installed in the clock vault and was rated and ready for use on the first of October. The temperature of the clock vault was maintained by small electric heating units controlled by a kerosene-mercury thermostat. Except for a short interval of a few days, November 6–8, the temperature of the clock vault was satisfactorily constant. The average range from October 1 to November 6 was 1°.4 F. per day and the total range for the period was 2°.7 F. From November 6.7 to November 8.2 there was a range of 5°.0 F., due to a break in an electric circuit. From November 8 to November 30 the average range was 0°.6 F. per day and the total range for the period was 3°.0 F.

In the first period only two heating units were used. This did not seem to be quite enough as there was a noticeable diurnal fluctuation of temperature. In the second period four heating units were used, and the control was much improved as indicated by the smaller average daily range.

The clock developed a tendency to jump ahead two seconds at a time. Sometimes between dates there would be a considerable accumulation of such jumps. As such behavior had occurred before at the Naval Observatory in Washington, without materially disturbing the clock rate, it was decided to let this condition continue rather than to interrupt the work by attempting to remedy it, as that would necessitate opening the bell jar and seriously disturbing the clock rate for a considerable period of time.

The jumping of seconds causes the observed clock corrections to appear to be rather erratic, but when allowance is made for the jumps it is found that the clock performed quite satisfactorily though not as well as the clock in Washington.

At Washington Riefler clock No. 60, which was being used as the standard clock of the observatory at the time, was used for the longitude work. It was located in the observatory clock vault, whose total range of temperature for the period was 0°.4 F.

LAGS OF RELAYS

The star transits and the radio signals were recorded on the same chronograph, operated as a break circuit, with the same current flowing in all cases. All lag effects in the recording apparatus were thus eliminated. However, in order to get a chronograph record of the radio signals, it was necessary to step up the current from the radio receiving set by passing it through a sensitive relay. This was made the subject of a special investigation, and it was found that the lag thus introduced was a function of the current flowing through the relay and could be accurately evaluated experimentally.

The values of the lag for different current strengths were therefore measured and a graph representing these values was made. At San Diego the lag was measured four times during the progress of the work, and the average result was used for the entire period. The average difference between an observed value of the lag and the corresponding value deduced from the adopted curve is $\pm 0^s.004$. At Washington one set of values of the lag was used before October 7 and another set after that date, as there was a change made in the relay at that time. Measures of the lag at Washington were made eight times during the work. The average difference between an observed value of the lag and the corresponding value deduced from the adopted curve is $\pm 0^s.003$ for the values within the usual range. At Washington there were a few cases where the lag correction was rather large, and these corrections are much less reliable. For values of the lag greater than $0^s.050$ it is thought that the uncertainty may be as great as $0^s.010$. These uncertain values are few in number and are in connection with the reception of very weak signals. At San Diego all the corrections are between $-0^s.018$ and $-0^s.028$. At Washington about 80 per cent of the corrections lie between $-0^s.012$ and $-0^s.030$. Between these limits the lag correction is considered to be accurately known.

The current strength as indicated by a milliammeter was recorded for each signal received. Table II gives the actual corrections for lag used for each observation of a reception time at San Diego, and Table III gives the corresponding data for Washington. The numbers at the heads of the columns correspond to those given in Table I for the radio signals.

1757—29——35

TABLE II.—*Correction for Lag at San Diego*

[Unit = $0^s.001$. All quantities are negative]

Greenwich Date	No. 1	No. 2	No. 4	No. 5	No. 9	No. 13	No. 15	No. 16	M	No. 19	No. 28	No. 31
1926												
Oct. 2	24	24	--	24	--	24	25	23	--	24	--	--
3	25	25	25	24	--	21	--	21	--	23	24	24
4	24	24	20	23	--	24	23	20	--	23	--	--
5	--	25	--	24	--	--	25	21	--	23	24	23
6	24	24	24	23	25	--	--	23	--	23	--	24
7	--	26	24	25	--	24	24	25	--	24	25	23
8	24	24	23	23	25	24	23	23	--	24	24	23
9	26	26	24	23	--	24	21	20	--	19	26	23
10	24	24	--	24	--	24	--	23	23	24	--	--
11	26	26	--	23	--	26	23	21	--	19	24	23
12	24	24	28	24	--	24	24	24	--	24	24	24
13	26	26	--	23	--	--	21	21	--	19	25	24
14	24	24	21	23	--	--	23	24	--	24	--	23
15	26	26	22	21	--	26	21	21	--	21	24	24
16	24	24	--	24	--	24	--	24	26	25	25	24
17	26	26	27	25	--	26	--	21	--	23	23	23
18	24	24	--	25	25	24	--	24	23	23	24	24
19	24	24	27	21	26	26	27	21	26	23	24	23
20	25	24	--	24	--	24	26	23	26	24	25	24
21	26	26	24	21	--	24	21	21	--	21	24	24
22	24	24	26	24	26	--	21	24	26	24	24	24
23	26	26	22	25	--	26	22	21	26	24	24	24
24	26	26	27	25	--	25	25	25	26	25	--	--
25	27	27	25	24	--	25	22	20	27	25	25	25
26	26	26	--	26	28	26	--	26	28	26	25	25
27	24	28	--	22	--	28	26	23	26	--	24	23
28	24	24	28	24	--	24	26	24	26	24	25	24
29	26	26	27	23	--	26	27	21	26	23	26	24
30	24	26	--	24	--	24	25	24	26	24	--	--
31	26	26	24	23	--	26	27	21	--	23	23	24

TABLE II.—*Correction for Lag at San Diego*—Continued

[Unit=$0^s.001$. All quantities are negative]

Greenwich Date	C	No. 1	No. 2	No. 4	No. 5	No. 9	No. 13	No. 15	No. 16	M	No. 19	No. 28	No. 31
1926													
Nov. 1	--	24	24	24	24	26	24	21	24	26	26	24	24
2	--	26	26	--	23	--	26	--	23	26	24	24	24
3	--	24	24	25	24	--	24	24	23	25	24	26	26
4	--	26	26	27	21	--	26	22	21	27	24	24	24
5	--	24	24	23	23	--	24	25	23	26	24	24	24
6	--	24	24	26	21	26	24	22	21	--	21	24	24
7	--	24	24	24	24	26	24	24	24	24	24	24	24
8	--	26	26	24	23	--	26	24	23	24	--	25	24
9	--	24	24	21	24	25	24	25	25	26	24	24	23
10	--	26	26	--	21	24	24	22	21	--	24	26	24
11	--	24	24	23	24	25	24	21	24	--	25	24	24
12	--	24	24	26	23	27	24	24	23	25	26	24	25
13	--	24	24	--	--	25	24	24	24	26	24	25	24
14	--	24	24	26	21	26	26	22	21	26	24	24	24
15	--	24	24	23	24	25	24	23	24	26	24	25	24
16	23	24	24	22	21	--	24	22	21	26	23	24	26
17	24	24	24	24	24	26	24	21	24	24	24	24	24
18	24	24	24	22	23	24	24	--	23	--	24	26	26
19	--	24	24	21	24	26	24	19	24	27	26	26	26
20	24	--	--	21	20	25	24	21	25	26	26	24	26
21	--	24	24	24	24	--	24	21	24	24	24	26	23
22	--	26	26	21	21	25	26	21	25	26	23	25	25
23	24	24	24	--	24	27	24	21	24	26	26	--	--
24	--	26	26	21	23	27	24	--	21	27	26	24	24
25	25	24	24	23	24	27	24	18	24	--	24	24	26
26	--	26	26	22	21	27	24	21	21	26	24	24	26
27	22	24	25	19	24	--	24	23	24	26	--	24	24
28	23	24	24	22	23	26	24	--	21	--	--	24	24
29	--	26	24	24	24	25	24	--	24	--	--	24	25
30	--	24	24	22	21	26	24	22	21	26	--	24	24
Dec. 1	23	24	24	21	24	25	--	--	--	26	--	--	--

TABLE III.—*Correction for Lag at Washington*

[Unit=0ˢ.001. All quantities are negative]

Greenwich Date	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 9	No. 13	No. 14	No. 15	No. 16	No. 17	No. 21	No. 26	No. 28	No. 29	No. 30
1926																	
Oct. 2	--	--	--	13	--	24	--	18	--	13	--	--	17	24	22	22	14
3	15	15	--	13	--	--	22	15	22	12	--	21	15	--	13	--	14
4	17	20	--	--	--	--	17	13	--	10	--	--	13	--	13	17	19
5	--	26	22	22	--	18	--	22	20	15	--	22	17	24	18	--	--
6	20	20	--	18	--	--	24	--	--	--	--	--	13	22	13	32	--
7	13	13	24	20	--	--	--	13	26	20	--	26	15	19	15	15	15
8	17	23	28	24	--	--	--	21	55	40	--	33	23	22	19	43	31
9	16	22	--	24	--	--	--	16	--	24	--	--	19	30	24	--	35
10	24	24	40	22	--	--	28	23	43	--	--	23	24	27	20	40	--
11	16	17	--	15	--	--	27	19	--	22	--	40	19	27	19	37	25
12	19	19	24	19	--	--	43	19	--	19	--	27	31	33	22	--	16
13	23	27	28	31	--	--	16	27	--	--	--	--	19	23	24	--	--
14	19	--	25	19	--	--	28	19	19	21	31	15	17	40	22	--	--
15	18	20	28	17	--	--	19	21	37	18	--	--	21	40	22	35	16
16	16	16	--	24	--	--	22	22	6	14	--	--	19	30	19	46	15
17	23	21	13	17	--	--	21	27	16	20	23	--	16	28	22	12	16
18	14	14	15	9	--	--	27	18	20	10	--	--	19	30	19	19	19
19	19	19	--	24	--	--	27	19	19	21	--	--	19	40	19	--	19
20	19	22	--	24	--	--	18	17	--	19	--	--	19	37	19	--	30
21	19	19	22	25	--	--	43	19	28	17	--	23	19	33	20	19	14
22	20	19	16	17	--	--	21	22	--	21	19	23	16	24	20	--	28
23	19	16	--	--	--	--	31	17	--	13	--	27	19	37	19	37	24
24	18	20	17	23	--	--	21	30	11	19	--	16	21	30	24	--	--
25	20	22	30	13	--	--	24	17	--	16	--	--	16	21	19	--	24
26	19	19	--	19	--	--	21	19	24	24	--	--	24	20	17	14	24
27	17	21	22	15	--	--	22	18	--	15	--	--	19	22	19	14	16
28	18	20	--	14	--	37	25	19	19	16	35	--	16	31	19	13	24
29	24	24	27	24	--	--	30	20	17	22	37	28	16	31	19	--	8
30	16	19	--	9	--	--	27	22	--	4	61	--	19	35	27	16	18
31	19	19	24	18	--	20	24	18	14	24	30	13	18	--	24	--	8

TABLE III.—*Correction for Lag at Washington*—Continued

[Unit=$0^s.001$. All quantities are negative]

Greenwich Date	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 9	No. 13	No. 14	No. 15	No. 16	No. 17	No. 21	No. 26	No. 28	No. 29	No. 30
1926																	
Nov. 1	21	16	--	9	--	--	40	17	--	10	60	29	19	31	19	29	16
2	16	16	19	16	--	--	--	16	11	12	43	--	19	37	18	8	13
3	17	16	--	34	--	--	30	19	8	24	--	--	16	27	16	13	16
4	16	16	13	21	--	--	30	16	10	8	55	--	19	28	17	--	8
5	19	19	--	17	--	28	50	19	--	17	31	13	18	25	16	--	--
6	17	23	--	22	--	--	28	14	--	16	--	75	16	30	20	--	6
7	17	15	--	16	--	--	37	18	--	9	65	--	18	27	19	--	31
8	18	20	--	13	--	--	50	17	--	25	--	--	16	31	16	--	9
9	16	16	--	19	--	--	25	16	--	16	37	--	21	43	22	--	16
10	18	16	--	--	--	58	43	17	--	7	65	--	16	24	16	--	16
11	16	16	--	16	--	--	40	24	--	17	30	--	18	43	16	--	--
12	17	20	11	14	--	--	25	27	8	21	32	--	16	24	16	--	16
13	17	24	2	8	--	--	33	20	--	--	43	--	18	43	21	--	--
14	18	24	--	--	--	--	31	18	--	--	31	--	17	33	16	8	11
15	16	20	10	16	--	--	57	17	7	10	43	--	16	28	17	--	24
16	--	16	--	24	--	--	27	16	20	19	28	--	18	65	30	31	36
17	31	27	36	15	--	--	55	24	31	--	--	--	16	18	19	--	--
18	16	16	--	24	--	--	23	16	--	--	--	--	25	50	20	--	31
19	21	18	18	10	28	--	21	27	21	17	32	17	16	20	19	--	15
20	--	--	43	20	--	--	13	19	14	15	43	--	17	31	16	58	10
21	--	14	19	12	--	--	--	--	--	--	31	--	41	14	33	--	10
22	28	24	--	16	31	--	23	37	15	17	--	--	17	--	15	6	19
23	21	24	--	--	--	33	27	21	--	9	23	19	19	50	17	--	22
24	20	20	--	24	--	--	20	16	--	--	31	--	18	19	16	12	7
25	16	16	--	13	--	--	17	20	14	8	24	32	--	27	25	--	15
26	19	16	17	14	--	--	35	16	17	16	--	16	16	--	19	10	7
27	18	19	--	14	--	--	--	19	--	18	--	--	22	35	19	23	14
28	21	20	--	11	--	--	19	20	--	--	24	37	18	50	19	--	12
29	21	24	--	10	--	52	33	18	--	--	65	--	19	20	17	--	13
30	20	20	--	23	--	--	20	24	--	13	43	--	16	20	24	11	13
Dec. 1	19	19	--	8	--	--	33	--	--	--	--	--	22	--	--	--	--

ASTRONOMICAL INSTRUMENTS

At San Diego the instrument used for determining time was one of the transits secured in 1913 and made by Prin of Paris, three photographs of which appear in the appendix to Volume IX, Publications of the United States Naval Observatory, Plates II, III, and IV. Several changes had been made in the instrument as follows:

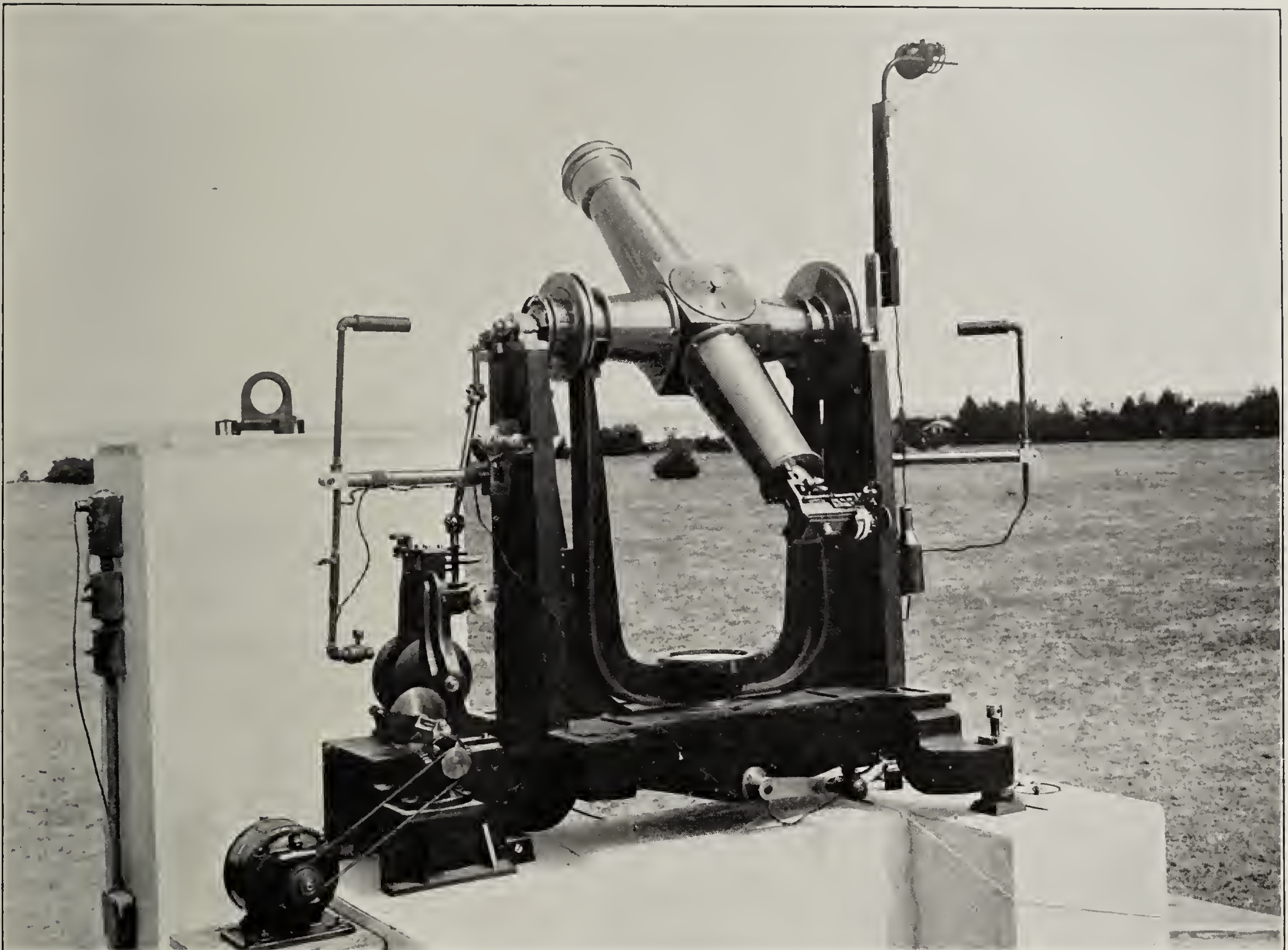
1. The springs in the transit micrometer were changed so that the motion in the direction controlled by the springs was more positive and secure.
2. The electric contacts were changed so as to use "breaks" in the circuit instead of "makes" to produce the record on the chronograph.
3. A small 110-volt alternating current motor was substituted for the original direct current motor for driving the transit micrometer.
4. The micrometer screw, which had been damaged, was replaced.

At Washington a similar instrument was used.

The levels.—Very excellent level vials, made by Pessler, were used. The values of a division were measured several times during the progress of the work. The level triers were modified so that this could be done without removing the vials from the striding level frames, thus avoiding possible changes of scale value which might have been produced by removing and replacing them.

Adopted value of one division at San Diego $=1''.05$.
Adopted value of one division at Washington $=0''.95$.

The nadir level.—In order to have a check on the level of the transit instrument, it was planned to observe a nadir level at least once each night. This proved very difficult to carry out at San Diego as the nadir images were almost always very bad, even when there was no suspicion of a breeze. It is thought that the poor images may have been due to vibrations set up by the surf on the ocean beach, although it was several miles away. For this reason the individual nadir level values are not very accordant, but it is thought that in the general mean the comparisons of the spirit and nadir levels indicate that there is no systematic difference between them. The results of the comparisons are given in Table IV for San Diego and in Table V for Washington.



THE PRIN TRANSIT SAN DIEGO

TABLE IV.—*Comparison of Spirit and Nadir Levels at San Diego*

Greenwich Date	Obsr.	Sp. Level	Nad. Level	Sp.−Nad.	Greenwich Date	Obsr.	Sp. Level	Nad. Level	Sp.−Nad.
1926		s	s	s	1926		s	s	s
Oct. 3. 1	L.	−0. 103	−0. 093	−0. 010	Oct. 30. 2	L.	+0. 035	+0. 012	+0. 023
4. 1	Hd.	− . 052	+ . 012	− . 064	31. 1	Hd.	+ . 018	. 000	+ . 018
5. 2	L.	− . 006	− . 031	+ . 025	Nov. 1. 1	L.	+ . 054	− . 008	+ . 062
6. 1	Hd.	+ . 036	+ . 043	− . 007	2. 1	Hd.	− . 030	− . 016	− . 014
6. 2	Hd.	+ . 035	+ . 016	+ . 019	3. 2	L.	− . 018	− . 016	− . 002
6. 3	Hd.	+ . 075	+ . 023	+ . 052	5. 2	L.	+ . 036	+ . 023	+ . 013
7. 2	L.	+ . 075	+ . 066	+ . 009	6. 1	Hd.	− . 036	− . 039	+ . 003
7. 2	L.	+ . 066	+ . 066	. 000	7. 1	L.	− . 150	− . 171	+ . 021
8. 1	Hd.	+ . 027	+ . 004	+ . 023	9. 1	L.	+ . 082	+ . 050	+ . 032
8. 2	Hd.	+ . 028	+ . 066	− . 038	10. 1	Hd.	+ . 082	+ . 124	− . 042
10. 1	Hd.	+ . 076	+ . 027	+ . 049	12. 1	Hd.	− . 114	− . 062	− . 052
10. 2	Hd.	+ . 032	− . 012	+ . 044	14. 4	Hd.	+ . 088	+ . 128	− . 040
11. 1	L.	+ . 128	+ . 155	− . 027	15. 2	L.	− . 014	+ . 019	− . 033
12. 1	Hd.	+ . 029	+ . 058	− . 029	16. 2	Hd.	+ . 020	+ . 012	+ . 008
14. 1	Hd.	+ . 094	+ . 074	+ . 020	17. 1	L.	+ . 019	. 000	+ . 019
15. 2	L.	+ . 061	+ . 043	+ . 018	18. 1	Hd.	+ . 031	+ . 031	. 000
16. 1	Hd.	+ . 118	+ . 105	+ . 013	19. 1	L.	+ . 069	+ . 108	− . 039
18. 2	Hd.	− . 018	− . 016	− . 002	20. 2	Hd.	+ . 063	+ . 043	+ . 020
20. 1	Hd.	+ . 092	+ . 054	+ . 038	21. 1	L.	+ . 024	+ . 031	− . 007
21. 3	Hd.	+ . 090	+ . 132	− . 042	24. 1	Hd.	− . 042	− . 050	+ . 008
22. 2	L.	+ . 108	+ . 132	− . 024	25. 3	L.	− . 007	− . 008	+ . 001
27. 1	Hd.	+ . 117	+ . 144	− . 027	26. 1	Hd.	+ . 041	+ . 031	+ . 010
28. 1	L.	+ . 123	+ . 186	− . 063	29. 1	L.	+ . 034	+ . 012	+ . 022
28. 2	L.	+ . 104	+ . 054	+ . 050	30. 1	Hd.	+ . 083	+ . 047	+ . 036
29. 1	Hd.	+0. 130	+0. 151	−0. 021	Dec. 1. 1	L.	−0. 036	0. 000	−0. 036

Means of Differences (Spirit-Nadir)

	Littell	Hammond	All	
	s	s	s	s
October	0. 000_{10}	+0. 003_{17}	+0 002_{27}	±0. 004
November	+0 004_{12}	−0. 006_{11}	0. 000_{23}	±0. 004
October and November	+0. 002_{22}	−0. 001_{28}	+0. 001_{50}	±0. 003

The probable error of a single difference is ±0^s.020 for each observer.

TABLE V.—*Comparison of Spirit and Nadir Levels at Washington*

Greenwich Date	Sp. Level	Nad. Level	Sp.—Nad.	Greenwich Date	Sp. Level	Nad. Level	Sp.—Nad.
1926	s	s	s	1926	s	s	s
Oct. 3. 1	+0. 047	−0. 071	+0. 118	Oct. 29. 1	+0. 001	−0. 014	+0. 015
3. 9	− . 016	− . 036	+ . 020	Nov. 1. 3	+ . 023	+ . 024	− . 001
4. 1	+ . 001	+ . 020	− . 019	2. 1	+ . 024	+ . 038	− . 014
4. 3	+ . 016	+ . 040	− . 024	3. 1	− . 090	− . 079	− . 011
5. 4	+ . 060	+ . 032	+ . 028	3. 3	− . 010	− . 004	− . 006
6. 1	+ . 062	+ . 071	− . 009	4. 1	− . 094	− . 077	− . 017
7. 2	+ . 023	+ . 044	− . 021	5. 1	− . 004	+ . 024	− . 028
10. 1	+ . 064	+ . 087	− . 023	5. 1	+ . 011	+ . 002	+ . 009
11. 3	+ . 072	+ . 079	− . 007	6. 1	− . 006	− . 008	+ . 002
13. 1	+ . 061	+ . 063	− . 002	7. 1	− . 010	− . 034	+ . 024
15. 1	+ . 048	+ . 044	+ . 004	8. 1	− . 072	− . 061	− . 011
16. 1	+ . 040	+ . 067	− . 027	12. 1	− . 085	− . 091	+ . 006
18. 1	+ . 042	+ . 022	+ . 020	13. 1	+ . 051	+ . 079	− . 028
19. 1	− . 058	− . 067	+ . 009	15. 1	− . 020	− . 022	+ . 002
20. 1	+ . 006	+ . 085	− . 079	17. 4	− . 018	− . 024	+ . 006
20. 1	+ . 014	+ . 123	− . 109	18. 1	+ . 052	+ . 028	+ . 024
20. 1	+ . 005	− . 022	+ . 027	18. 1	− . 081	− . 085	+ . 004
21. 1	− . 020	− . 004	− . 016	19. 3	+ . 028	− . 008	+ . 036
22. 1	− . 040	− . 034	− . 006	19. 4	+ . 036	+ . 016	+ . 020
23. 1	− . 019	− . 034	+ . 015	20. 1	− . 088	− . 085	− . 003
26. 1	− . 021	− . 040	+ . 019	23. 1	+ . 060	+ . 057	+ . 003
27. 3	+ . 014	− . 030	+ . 044	24. 1	+ . 022	+ . 022	. 000
28. 1	−0. 046	−0. 055	+0. 009	25. 1	−0. 064	−0. 042	−0. 022

Means of Differences (Spirit-Nadir)

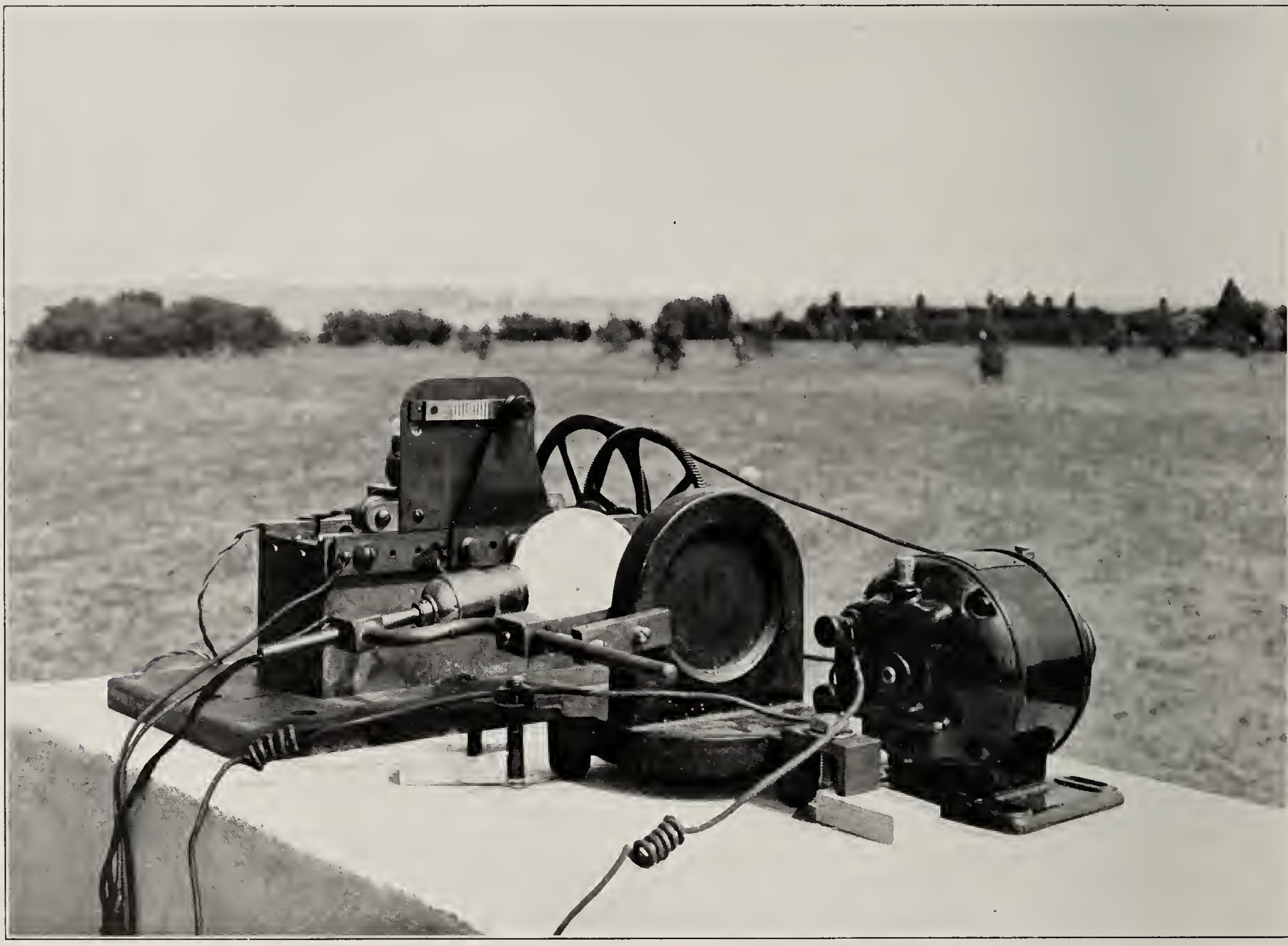
	s	s
October	-0.001_{24}	±0. 006
November	0.000_{22}	±0. 002
October and November	0.000_{46}	±0. 003

The probable error of a single difference is $\pm 0^{s}.021$.

THE RIGHT ASCENSION MICROMETER SCREWS

By the method of observing all errors of the micrometer screws were eliminated from the transit observations. Therefore no examination of the screws has been made except the determination of the general value of a revolution for use in deducing azimuths of the instrument from measures on the meridian marks and for deducing the corrections for duration of the contacts. The value of one revolution of the micrometer screw for Transit No. 1 was determined from the observations of transit of stars between declinations +18° and +87° and for Transit No. 2 from the observations of transits of stars between declinations +23° and +50°. The resulting values are as follows:

	s	s
Transit No. 1 (San Diego), one revolution	7. 762	±0. 004
Transit No. 2 (Washington), one revolution	7. 930	±0. 007



THE MERIDIAN MARK AND PERSONAL EQUATION MACHINE, SAN DIEGO

It is to be noted that the value of a revolution of the screw of Transit No. 1 is materially different from the value used in the 1913–14 work, due to the fact already mentioned that the original screw had been replaced by a new one.

The transit micrometer was electrically driven and the speed was regulated by setting a friction disk before each observation. Fine motion was by hand, acting through planetary gears.

The micrometer was arranged to break an electric circuit automatically either five or ten times during each revolution, with an extra break to indicate the beginning of a revolution. Each break could be recorded on the chronograph.. In practice 10 signals per revolution were used and were recorded for about 2 revolutions preceding and 2 following reversal. Of these signals, 10 of the first and 10 of the second series were read off and used. The recording of the signals was controlled by a switch operated by the observer, and signals were recorded only when the stars were between certain of the fixed threads of the reticule. The azimuth stars were observed in the same way as the clock stars except that the micrometer was driven by hand instead of by the electric motor.

THE AZIMUTHS OF THE MERIDIAN MARKS

The meridian mark in each case consisted of an artificial star produced by the illumination of a small circular hole in a metal plate. This was located to the northward of the transit instrument in the focus of the meridian mark lens, which was of three inches aperture and approximately 160 feet focal length.

The azimuth of the mark, both at San Diego and at Washington, was very steady. At San Diego there is practically no difference between determinations from above and below pole observations, but there was evidently a small systematic difference between the results of the two observers. At Washington there is a small systematic difference between the above and below pole determinations.

TABLE VI.—*Azimuth of Meridian Mark at San Diego*

Greenwich Date	Obs.	Star	A	Greenwich Date	Obs.	Star	A
1926			s	1926			s
Sept. 29. 1	Hd.	51 H. Cephei s. p.	+0. 66	Nov. 11. 2	L.	α Ursæ Minoris	+0. 70
Oct. 4. 1	Hd.	51 H. Cephei s. p.	+0. 63	11. 4	L.	ε Ursæ Minoris s. p.	+0. 68
5. 1	L.	51 H. Cephei s. p.	+0. 72	12. 1	Hd.	30 H. Camelop. s. p.	+0. 58
6. 1	Hd.	51 H. Cephei s. p.	+0. 57	13. 4	L.	ε Ursæ Minoris s. p.	+0. 69
6. 2	Hd.	39 H. Cephei	+0. 59	13. 4	L.	δ Ursæ Minoris s. p.	+0. 71
7. 1	L.	51 H. Cephei s. p.	+0. 64	14. 1	Hd.	1 H. Draconis s. p.	+0. 65
7. 2	L.	43 H. Cephei	+0. 64	14. 1	Hd.	39 H. Cephei	+0. 63
8. 1	Hd.	1 H. Draconis s. p.	+0. 56	14. 4	Hd.	Groomb. 750	+0. 66
8. 2	Hd.	α Ursæ Minoris	+0. 64	14. 4	Hd.	ε Ursæ Minoris s. p.	+0. 64
10. 2	Hd.	1 H. Draconis s. p.	+0. 65	15. 1	L.	1 H. Draconis s. p.	+0. 67
10. 2	Hd.	39 H. Cephei	+0. 63	15. 1	L.	30 H. Camelop. s. p.	+0. 67
11. 1	L.	1 H. Draconis s. p.	+0. 66	15. 2	L.	ε Ursæ Minoris s. p.	+0. 64
12. 1	Hd.	76 Draconis	+0. 64	15. 4	L.	Groomb. 944	+0. 66
15. 2	L.	1 H. Draconis s. p.	+0. 63	16. 1	Hd.	30 H. Camelop. s. p.	+0. 58
16. 2	Hd.	1 H. Draconis s. p.	+0. 56	16. 2	Hd.	39 H. Cephei	+0. 67
18. 2	Hd.	30 H. Camelop. s. p.	+0. 59	16. 4	Hd.	Groomb. 642	+0. 59
20. 1	Hd.	1 H. Draconis s. p.	+0. 58	16. 4	Hd.	ε Ursæ Minoris s. p.	+0. 63
21. 3	Hd.	α Ursæ Minoris	+0. 65	17. 1	L.	32[2] Camelop. s. p.	+0. 63
22. 2	L.	30 H. Camelop. s. p.	+0. 68	17. 2	L.	43 H. Cephei	+0. 63
22. 2	L.	α Ursæ Minoris	+0. 61	17. 3	L.	δ Ursæ Minoris s. p.	+0. 69
28. 1	L.	76 Draconis	+0. 69	18. 2	Hd.	Bradley 1672 s. p.	+0. 55
28. 1	L.	1 H. Draconis s. p.	+0. 68	18. 2	Hd.	43 H. Cephei	+0. 57
29. 1	Hd.	76 Draconis	+0. 67	18. 4	Hd.	Groomb. 642	+0. 63
30. 1	L.	1 H. Draconis s. p.	+0. 68	19. 1	L.	43 H. Cephei	+0. 62
30. 2	L.	α Ursæ Minoris	+0. 69	19. 2	L.	α Ursæ Minoris	+0. 67
31. 1	Hd.	76 Draconis	+0. 64	20. 2	Hd.	43 H. Cephei	+0. 60
31. 1	Hd.	1 H. Draconis s. p.	+0. 57	21. 1	L.	30 H. Camelop. s. p.	+0. 62
Nov. 1. 1	L.	1 H. Draconis s. p.	+0. 70	21. 1	L.	43 H. Cephei	+0. 68
1. 1	L.	Groomb. 2283 s. p.	+0. 74	21. 4	L.	ε Ursæ Minoris s. p.	+0. 67
2. 1	Hd.	76 Draconis	+0. 56	21. 5	L.	51 H. Cephei	+0. 65
2. 1	Hd.	1 H. Draconis s. p.	+0. 60	22. 1	Hd.	30 H. Camelop. s. p.	+0. 64
2. 4	Hd.	Groomb. 750	+0. 63	24. 1	Hd.	30 H. Camelop. s. p.	+0. 66
3. 2	L.	39 H. Cephei	+0. 67	24. 1	Hd.	39 H. Cephei	+0. 60
3. 3	L.	ε Ursæ Minoris s. p.	+0. 72	26. 1	Hd.	30 H. Camelop. s. p.	+0. 74
5. 1	L.	Bradley 3058	+0. 79	26. 1	Hd.	39 H. Cephei	+0. 68
7. 1	L.	1 H. Draconis s. p.	+0. 68	28. 1	Hd.	30 H. Camelop. s. p.	+0. 70
9. 2	L.	43 H. Cephei	+0. 62	28. 1	Hd.	39 H. Cephei	+0. 61
9. 2	L.	α Ursæ Minoris	+0. 65	29. 3	L.	ε Ursæ Minoris s. p.	+0. 66
10. 1	Hd.	1 H. Draconis s. p.	+0. 57	30. 1	Hd.	30 H. Camelop. s. p.	+0. 68
10. 1	Hd.	30 H. Camelop. s. p.	+0. 69	30. 1	Hd.	39 H. Cephei	+0. 69
10. 1	Hd.	39 H. Cephei	+0. 61	Dec. 1. 1	L.	30 H. Camelop. s. p.	+0. 64
10. 4	Hd.	ε Ursæ Minoris s. p.	+0. 61				

Summary of Results at San Diego

	Littell		Hammond	
	Upper Culmination	Lower Culmination	Upper Culmination	Lower Culmination
	s	s	s	s
October	$+0.658_{4}$	$+0.670_{7}$	$+0.637_{7}$	$+0.597_{9}$
November	$+0.657_{11}$	$+0.676_{16}$	$+0.624_{14}$	$+0.634_{15}$

The adopted values were: Littell, $+0^{s}.670$; Hammond, $+0^{s}.624$.

TABLE VII.—*Azimuth of Meridian Mark at Washington*

Greenwich Date	Obs.	Star	A	Greenwich Date	Obs.	Star	A
1926			s	1926			s
Oct. 3. 1	Ws.	76 Draconis	−0. 86	Nov. 1. 2	Ws.	Groomb. 2283 s. p.	−0. 75
4. 1	Ws.	Bradley 1672 s. p.	−0. 67	2. 1	Ws.	1 H. Draconis s. p.	−0. 72
4. 2	Ws.	43 H. Cephei	−0. 72	2. 1	Ws.	30 H. Camelop. s. p.	−0. 75
5. 2	Ws.	32^2 H. Camelop. s. p.	−0. 80	3. 2	Ws.	Groomb. 2283 s. p.	[−0. 61]
5. 2	Ws.	43 H. Cephei	−0. 79	4. 1	Ws.	1 H. Draconis s. p.	−0. 76
6. 1	Ws.	25 H. Camelop. s. p.	−0. 72	5. 1	Ws.	1 H. Draconis s. p.	−0. 75
6. 1	Ws.	76 Draconis	−0. 74	6. 1	Ws.	30 H. Camelop. s. p.	−0. 78
7. 2	Ws.	Bradley 1672 s. p.	−0. 73	6. 1	Ws.	39 H. Cephei	−0. 81
7. 2	Ws.	43 H. Cephei	−0. 79	7. 1	Ws.	30 H. Camelop. s. p.	−0. 72
8. 2	Ws.	Bradley 1672 s. p.	−0. 68	7. 1	Ws.	39 H. Cephei	−0. 79
8. 2	Ws.	43 H. Cephei	−0. 74	8. 1	Ws.	30 H. Camelop. s. p.	−0. 73
9. 1	Ws.	76 Draconis	−0. 79	8. 1	Ws.	39 H. Cephei	−0. 78
10. 1	Ws.	76 Draconis	−0. 79	11. 2	Ws.	Groomb. 2283 s. p.	−0. 79
10. 1	Ws.	1 H. Draconis s. p.	−0. 77	11. 2	Ws.	Groomb. 750	−0. 71
15. 1	Ws.	76 Draconis	−0. 82	12. 1	Ws.	30 H. Camelop. s. p.	−0. 76
15. 1	Ws.	1 H. Draconis s. p.	−0. 77	12. 1	Ws.	39 H. Cephei	−0. 80
16. 1	Ws.	76 Draconis	−0. 79	13. 1	Ws.	30 H. Camelop. s. p.	−0. 75
16. 1	Ws.	1 H. Draconis s. p.	−0. 75	13. 1	Ws.	39 H. Cephei	−0. 78
18. 1	Ws.	76 Draconis	−0. 81	15. 1	Ws.	30 H. Camelop. s. p.	−0. 75
18. 1	Ws.	1 H. Draconis s. p.	−0. 80	17. 3	Ws.	δ Ursæ Minoris s. p.	−0. 65
19. 1	Ws.	30 H. Camelop. s. p.	−0. 82	17. 3	Ws.	25 H. Camelop	−0. 70
20. 1	Ws.	76 Draconis	−0. 78	18. 1	Ws.	30 H. Camelop. s. p.	−0. 66
20. 1	Ws.	30 H. Camelop. s. p.	−0. 76	18. 1	Ws.	39 H. Cephei	−0. 73
21. 1	Ws.	76 Draconis	−0. 67	19. 2	Ws.	Groomb. 750	−0. 65
21. 1	Ws.	1 H. Draconis s. p.	−0. 78	19. 2	Ws.	ε Ursæ Minoris s. p.	−0. 67
22. 1	Ws.	76 Draconis	−0. 80	20. 1	Ws.	39 H. Cephei	−0. 74
22. 1	Ws.	1 H. Draconis s. p.	−0. 81	23. 1	Ws.	39 H. Cephei	−0. 70
23. 1	Ws.	1 H. Draconis s. p.	−0. 75	24. 1	Ws.	39 H. Cephei	−0. 68
26. 1	Ws.	76 Draconis	−0. 80	24. 1	Ws.	Bradley 1672 s. p.	−0. 68
26. 1	Ws.	1 H. Draconis s. p.	−0. 70	25. 1	Ws.	39 H. Cephei	−0. 73
27. 2	Ws.	α Ursæ Minoris	−0. 77	28. 1	Ws.	39 H. Cephei	−0. 72
28. 1	Ws.	1 H. Draconis s. p.	−0. 73	28. 1	Ws.	Bradley 1672 s. p.	−0. 68
28. 1	Ws.	30 H. Camelop. s. p.	−0. 74	29. 1	Ws.	39 H. Cephei	−0. 72
29. 1	Ws.	1 H. Draconis s. p.	−0. 76	Dec. 1. 1	Ws.	32^2 H. Camelop. s. p.	−0. 67
Nov. 1. 2	Ws.	α Ursæ Minoris	−0. 78	1. 1	Ws.	43 H. Cephei	−0. 74

Summary of Results at Washington

	Upper Culmination	Lower Culmination	Adopted A
	s	s	s
Oct. 3. 1–Oct. 10. 1	-0.778_8	-0.728_6	-0.756_{14}
Oct. 15. 1–Oct. 23. 1	-0.778_6	-0.780_8	-0.779_{14}
Oct. 26. 1–Nov. 8. 1	-0.788_6	-0.741_{12}	-0.757_{18}
Nov. 11. 3–Nov. 20. 1	-0.730_7	-0.719_7	-0.724_{14}
Nov. 23. 1–Dec. 1. 1	-0.714_5	-0.677_3	-0.700_8

DURATION OF CONTACTS

By reversing the transit instrument on each star the collimation error is eliminated, but a small error is introduced, depending on the duration of the contact which makes the automatic record on the chronograph. In order to correct for this, measurements were made by turning the micrometer slowly until contact was made, as evidenced by the sound of the relay, first in one direction and then in the other, and noting the readings when contact was made. This was done for each of the 10 contacts and the mean was taken. Calling the quantity D, expressed in seconds of time, the correction to be applied to each observation is $+\frac{1}{2}\,D \sec \delta$. D can also be obtained from chronographic record of the lengths of the signals.

Table VIII.—*Measured Values of ½ D*

San Diego			Washington		
1926		s	1926		s
Sept. 30	Hd.	0. 024	Sept. 27	Ws.	0. 038
Oct. 4	L.	. 025	Oct. 3	Ws.	. 040
12	Hd.	. 026	8	Ws.	. 037
19	L.	. 029	11	Ws.	. 036
19	Hd.	. 028	14	Ws.	. 036
26	Hd.	. 028	19	Ws.	. 034
Nov. 2	Hd.	. 028	27	Ws.	. 033
6	Hd.	. 028	29	Ws.	. 032
14	Hd.	. 028	Nov. 1	Ws.	. 033
24	Hd.	. 028	4	Ws.	. 033
30	Hd.	0. 029	8	Ws.	. 034
			11	Ws.	. 032
			17	Ws.	. 034
			19	Ws.	. 036
			20	Ws.	. 034
			23	Ws.	. 033
			28	Ws.	. 033
			Dec. 1	Ws.	0. 034

THE ASTRONOMICAL PROGRAM

At San Diego it was planned to observe two time sets each night, one in the early evening at about the time of radio signals Nos. 1 to 6 for the longitude San Diego–Algiers and one about seven hours later when the signals Nos. 13 to 19 were due for the longitude Shanghai–San Diego. As soon as work was begun it was found that fog and condensation would interfere very seriously with the securing of the second group of clock stars. Indeed, in October it was often difficult to secure even the first group as the fog came in from the ocean very soon after sunset.

The condensation on the instrument late in the night was often very heavy. One effect of this extreme humidity was to cause slackening of the threads in the micrometer, which in a few cases prevented work even when there was no fog and the stars were shining brightly. In November conditions in this respect improved, and it was often possible to get the two groups. However, with the clock running as well as it did and with the temperature and pressure in the clock case controlled, one determination of the clock correction per night is considered sufficient for this work.

For each clock correction 8 or 10 clock stars and 1 or 2 azimuth stars were to be observed. The clock stars were to be balanced, north and south of the zenith, so far as practicable. Each star was to be observed, half with the circle east and half with circle west, eliminating the effects of collimation error and inequality of pivots. The level correction was determined by the striding spirit level between every two star observations and the azimuth correction by means of readings on the meridian mark also made between every two star observations.

At Washington the same program was followed except that only one time set was to be taken at about the time of signals Nos. 1 to 6.

THE CLOCK CORRECTIONS

The star places used are those of "Positions and Proper Motions of 1504 Standard Stars for the Equinox 1925.0," Astronomical Papers of the American Ephemeris and Nautical Almanac, Volume X, Part 1.

The probable error of a clock correction from a single star was practically the same for all the observers.

Observer	Probable Error	Number of Observations
	s	
Littell	$\pm 0.017 \sec \delta$	278
Hammond	$\pm 0.018 \sec \delta$	273
Watts	$\pm 0.016 \sec \delta$	301

For each observing night the mean observed clock correction was plotted, and these points were connected by straight lines whose inclinations determine the clock rates. From these the adopted clock corrections were read off for each radio signal. However, when two groups of clock stars were observed on the same night, as was sometimes the case at San Diego, the adopted clock corrections were made to depend on the mean observed clock correction of the nearest group while using the daily clock rate determined as above.

Tables XIII and XIV give the observed clock correction obtained from each star not corrected for personal equation and referred to the meridian of the instrument.

Tables XV and XVI give for each group of clock stars the mean observed clock correction corrected for personal equation and, in the case of Washington, reduced to the standard meridian of the Naval Observatory.

PERSONAL EQUATIONS

Personal equation machines were available at both San Diego and Washington. The illustration, Plate No. IV, showing the one at San Diego will give a good idea of its construction and use. It was located on the same pier as the meridian mark and consisted, essentially, of a carriage moved by a screw which was kept in motion by a small electric motor. As the carriage came to the end of its run an automatic

device caused it to disengage from the screw and to engage with another screw revolving in the opposite direction. Thus the carriage moved back and forth on its path continuously as long as the current was on. The carriage carried an artificial star consisting of a small hole in a metal plate illuminated by a 3.8-volt light and a stylus that made contact with a brass plate in which were inserted 10 ivory strips. The chronograph circuit was made to pass through the stylus and the breaks as the stylus passed over the ivory strips were recorded on the chronograph. The instrument was so designed that these breaks occurred at approximately the same intervals as those between the records of a transit of a zenith star.

The observations for personal equation consist in observing the transit of this artificial star with the Prin transit, the transits and the breaks caused by the stylus being recorded on the chronograph. A complete set comprised the observation as the star was passing both ways over the field.

The difference between successive corresponding records of the star and of the stylus should be a constant quantity, K, if there were no personal equation, P. In one direction the measured difference M will be increased by P and in the other direction it will be diminished by P, so that

$$M \text{ (direct motion of carriage)} = K + P$$
$$M' \text{ (reverse motion of carriage)} = K - P$$
$$P = \frac{M - M'}{2}$$

Some of the observations were made with the reversing prism, so that the direction of motion could be kept the same for the observer for both motions of the carriage.

At San Diego it was found that there was no appreciable effect due to the apparent direction of motion, but there was a small effect due to whether the transit instrument was used circle east or circle west.

This difference may be due to slightly different action of the transit micrometer in its two different directions of motion, one with the spring and one against the spring. In any case the quantity desired is the mean of the two.

In Table IX the results at San Diego are given as observed and as reduced to the mean of $\frac{W+E}{2}$.

In Table X the results at Washington are given.

The differences between LITTELL and HAMMOND, as determined from the machine and as determined from the stars, were as follows for three periods:

Littell—Hammond		
Period	Machine	Stars
	s	s
I	−0.022	−0.033
II	−0.015	−0.019
III	+0.001	−0.007

By combining all the results, both from the machine and from the stars, the following values were obtained for the absolute personal equation:

Period	Littell	Hammond
	s	s
I	−0. 032	−0. 001
II	−0. 024	−0. 006
III	−0. 011	−0. 006
Mean	−0. 022	−0. 004

In the case of HAMMOND the constant correction $-0^s.004 \pm 0^s.003$ was applied to the clock corrections.

In the case of LITTELL, as there seemed to be indication of progressive change, the observed values were plotted and the corrections were read from the graph. They were as follows:

Personal Equation Corrections for Observations by Littell

	s		s		s		s
Oct. 3	−0. 036	Oct. 17	−0. 032	Nov. 1	−0. 029	Nov. 15	−0. 025
5	− . 036	19	− . 032	3	− . 028	17	− . 025
7	− . 035	22	− . 031	5	− . 028	19	− . 024
11	− . 034	26	− . 030	7	− . 027	21	− . 022
13	− . 033	28	− . 030	9	− . 027	25	− . 016
15	−0. 033	30	−0. 029	11	− . 026	29	− . 011
				13	−0. 026	Dec. 1	−0. 008

In the case of WATTS, at Washington, the constant correction $-0^s.007 \pm 0^s.002$ was applied to the clock corrections.

While the results of the determinations of personal equation corrections show considerable uncertainty, it is considered that the application of the corrections is highly desirable, as these errors are thereby changed from the systematic to the accidental class, the latter being much less objectionable. The effectiveness of the corrections in coordinating the results of the two observers at San Diego is shown by the agreement of their separate results in the San Diego-Washington longitude, as given in Table XXI.

TABLE IX.—*Measures of Absolute Personal Equation at San Diego*

[Signs apply to Clock Correction]

Greenwich Date	Obsr.	Prism	Circle	Number of Sets	Observed Correction	Corr. $\frac{W+E}{2}$	Greenwich Date	Obsr.	Prism	Circle	Number of Sets	Observed Correction	Corr. $\frac{W+E}{2}$
1926					s	s	1926					s	s
Oct. 9. 1	L.	--	W.	10	−0. 072	−0. 058	Oct. 9. 1	Hd.	--	W.	10	−0. 020	−0. 006
15. 1	L.	--	W.	18	− . 033	− . 019	14. 1	Hd.	--	W.	20	− . 016	− . 002
24. 1	L.	--	W.	15	− . 016	− . 002	23. 1	Hd.	--	W.	16	− . 016	− . 002
30. 2	L.	--	E.	15	− . 019	− . 033	Nov. 2. 1	Hd.	--	E.	15	. 000	− . 014
Nov. 11. 2	L.	--	E.	15	− . 012	− . 026	10. 2	Hd.	--	W.	13	− . 024	− . 010
17. 2	L.	--	E.	18	− . 014	− . 028	16. 2	Hd.	--	W.	14	− . 034	− . 020
23. 2	L.	--	E.	13	− . 014	− . 028	24. 2	Hd.	--	W.	19	− . 049	− . 035
27. 1	L.	D.	E.	5	+ . 038	+ . 024	26. 2	Hd.	D.	W.	5	+ . 024	+ . 038
27. 1	L.	R.	E.	5	+ . 012	− . 002	26. 2	Hd.	R.	W.	16	+ . 012	+ . 026
27. 1	L.	R.	W.	5	− . 028	− . 014	28. 2	Hd.	D.	E.	8	+ . 050	+ . 036
27. 1	L.	D.	W.	5	− . 057	− . 043	28. 2	Hd.	R.	E.	8	+ . 020	+ . 006
28. 2	L.	D.	E.	8	− . 010	− . 024	28. 2	Hd.	D.	W.	7	− . 043	− . 029
28. 2	L.	R.	E.	8	+ . 012	− . 002	28. 2	Hd.	R.	W.	9	− . 005	+ . 009
28. 2	L.	R.	W.	8	− . 054	− . 040	29. 2	Hd.	D.	E.	7	− . 008	− . 022
28. 2	L.	D.	W.	8	− . 012	+ . 002	29. 2	Hd.	R.	E.	7	− . 022	− . 036
29. 2	L.	D.	E.	7	+ . 030	+ . 016	29. 2	Hd.	D.	W.	7	+ . 002	+ . 016
29. 2	L.	R.	E.	7	+ . 038	+ . 024	29. 2	Hd.	R.	W.	7	− . 034	− . 020
29. 2	L.	D.	W.	7	− . 028	− . 014	30. 2	Hd.	D.	E.	10	− . 014	− . 028
29. 2	L.	R.	W.	7	− . 046	− . 032	30. 2	Hd.	D.	W.	13	−0. 022	−0. 008
Dec. 1. 2	L.	D.	E.	10	− . 010	− . 024							
1. 2	L.	D.	W.	10	0. 000	+0. 014							

Absolute Personal Equation, Collected by Dates

Greenwich Date	Obsr.	Correction		Greenwich Date	Obsr.	Correction	
1926		s	s	1926		s	s
Oct. 9. 1	L.	−0. 058		Oct. 9. 1	Hd.	−0. 006	
15. 1	L.	− . 019	−0. 028	14. 1	Hd.	− . 002	−0. 006
24. 1	L.	− . 002		23. 1	Hd.	− . 002	
30. 2	L.	− . 033		Nov. 2. 1	Hd.	− . 014	
Nov. 11. 2	L.	− . 026		10. 2	Hd.	− . 010	
17. 2	L.	− . 028	−0. 023	16. 2	Hd.	− . 020	−0. 008
23. 2	L.	− . 028		24. 2	Hd.	− . 035	
27. 1	L.	− . 009		26. 2	Hd.	+ . 032	
28. 2	L.	− . 016		28. 2	Hd.	+ . 006	
29. 2	L.	− . 002	−0. 008	29. 2	Hd.	− . 016	−0. 009
Dec. 1. 2	L.	−0. 005		30. 2	Hd.	−0. 018	

TABLE X.—*Measures of Absolute Personal Equation at Washington*

[Signs apply to Clock Correction]

Greenwich Date	Obsr.	Prism	Circle	Number of Sets	Observed Correction
1926					s
Oct. 15. 1	Ws.	D.	E.	6	+0. 003
15. 1	Ws.	R.	E.	6	− . 002
22. 1	Ws.	D.	W.	6	− . 020
22. 1	Ws.	R.	W.	6	− . 007
28. 1	Ws.	D.	W.	6	− . 010
28. 1	Ws.	R.	W.	6	− . 003
Nov. 4. 1	Ws.	D.	W.	6	− . 001
4. 1	Ws.	R.	W.	6	− . 010
11. 1	Ws.	D.	E.	6	− . 004
11. 1	Ws.	R.	E.	6	− . 002
20. 1	Ws.	D.	E.	6	− . 026
20. 1	Ws.	R.	E.	6	− . 024
25. 1	Ws.	D.	W.	6	+ . 004
25. 1	Ws.	R.	W.	6	− . 010
30. 1	Ws.	D.	E.	6	− . 004
30. 1	Ws.	R.	E.	6	+0. 006

Summary

Prism	Circle	Number of Sets	Observed Correction
			s
D.	E.	24	−0. 008
D.	W.	24	− . 007
R.	E.	24	− . 006
R.	W.	24	−0. 008
	Mean		−0. 007

1757--29----36

THE RADIO RECEPTION

For the reception of the low frequency or long wave signals at San Diego a combination of loop and single wire antenna was used. These were connected to a barrage tuning unit. The object of this circuit was the reduction of atmospheric interference and also the elimination of interference from other stations, it being particularly useful in the reception of the Annapolis signal when station KIE at Honolulu was in operation. The output of the barrage unit was put into a standard navy tuner. An independent oscillator was used as a heterodyne or driver, being placed between the tuner and the amplifier. The amplifier, which was constructed at the Naval Observatory, consisted of three untuned radiofrequency stages with special iron core transformers, a detector, and two audio stages. A variable non-inductive resistance was placed across the secondary of the second audio frequency transformer for use as a volume control. The vacuum tubes used were 201A radiotrons made by the General Electric Co. The recording unit consisted of an old style 5-watt V. T. 2 Western Electric Co. vacuum tube with a small telegraph relay in its plate circuit. The relay was wound to a high resistance and was equipped with special pivots so as to prevent lost motion and variation in lag. The relay operated the chronograph circuit directly, its contacts being arranged so as to break the chronograph circuit when the incoming signals caused the relay to be energized. A plate battery of about 150 volts was used on the recorder and a grid biasing battery of about 45 volts. Portable dry cell "B" batteries were used in all plate circuits, and a lead storage battery was used for heating the filaments.

The high frequency or short wave receiver was of very simple design, consisting of an unshielded regenerative detector circuit in which regeneration was controlled by a variable resistor in series with the tickler or feed back coil. A single wire untuned antenna was used. The same audio amplifier and recorder was used with both the high and low frequency receivers, a suitable switching arrangement for this purpose being provided.

For the purpose of measuring the combined lag of the receiver and recorder a separate oscillator was provided. This was placed at such distances from the receiving equipment as to give signals of about the same range of power as those received in the regular work. It was decided to operate the oscillator continuously, since some uncertainty might exist as to the exact time of its response if an attempt were made to start and stop the oscillations. A relay operated by a chronometer was made to alternately short and open the input circuit of the receiver every second. Each time the circuit was opened the oscillations impressed by the oscillator would build up in the loop or antenna circuit and the recorder would operate the chronograph circuit. A suitable switching arrangement was provided so that the chronometer relay could be quickly transferred directly into the chronograph circuit, thus making it possible to measure the difference in time of the ticks as recorded directly and as recorded through the radio set.

At Washington the reception apparatus was very similar to that at San Diego except that the low frequency receiver used an oscillating detector instead of an independent heterodyne for the reception of continuous wave signals.

The radio signals.—The radio signals were recorded on the same cylinder chronograph as the star observations. When a complete or nearly complete set was recorded, it was easy to select, by means of the alignment of the signals in the consecutive minutes, signals not apparently affected by static. Five of these signals in the early part of the set and five near the end were read off and reduced to the time of the end signal. In nearly all cases there was satisfactory agreement between the means of the two sets of five. When the agreement was not good, two more sets of five were read off, and if the disagreement persisted independent values indicated by asterisks were used for the record of the first and last signal.

From 360 residuals taken at random as to dates and sets of signals the probable error of 1 signal tick as read off from the chronograph sheet was $\pm 0^s.010$ for San Diego. Similarly, the probable error of one signal tick as recorded at Washington was $\pm 0^s.008$.

This gives for the 10 signals usually read off a probable error of $\pm 0^s.003$ as deduced from the internal evidence.

In a few cases the static was extremely bad and the signals were identified with much difficulty. Even then it was usually possible to find occasional signals which were apparently but little affected by the static. Having the record on a cylinder chronograph which brings the corresponding seconds of successive minutes in line makes it comparatively easy to locate the effects of static by inspection.

The radio signals by ear.—At San Diego there were a number of reception observations made by ear, but none at Washington. Neither of the two radio observers had had any previous experience in making such observations. As there was so much recorded material available, it has not been considered advisable to use the ear observations. In general, the ear observations seem to give times a little too early compared with the times obtained by registration, the amounts varying from $0^s.01$ to $0^s.05$. The data available for comparison are given in Table XI, which gives the difference between the registration time and the time by coincidence for those signals that were observed in both ways.

TABLE XI.—*Corrections to Reduce Ear Observations of Radio Signals to Registration Observations, San Diego*

	Sollenberger							Moran						
	No. 5	No. 9	No. 13	No. 16	M	No. 19		No. 2	No. 5	No. 9	No. 13	No. 16	M	No. 19
1926	s	s	s	s	s	s	1926	s	s	s	s	s	s	s
Oct. 4	----	----	+0.01	0.00	----	----	Oct. 3	+0.01	----	----	−0.06	+0.04	----	+0.07
6	----	+0.02	----	− .05	----	−0.01	5	+ .08	+0.02	----	----	----	----	----
8	----	----	----	− .02	----	----	7	− .01	----	----	+ .10	+ .02	----	+ .02
10	----	----	----	.00	----	----	9	+ .04	+ .08	----	− .01	+ .06	----	+ .05
16	+0.03	----	----	+ .03	----	----	11	+ .03	− .02	----	+ .05	+ .05	----	− .03
18	----	----	+ .03	+ .02	----	----	13	+ .04	+ .02	----	----	----	----	----
20	----	----	+ .05	.00	----	----	15	+ .02	− .01	----	+ .01	----	----	----
22	----	+ .05	----	+ .05	----	----	17	+ .08	− .06	----	+ .03	+ .03	----	----
24	----	----	+ .04	+ .01	----	----	19	+ .01	− .03	----	----	+ .04	----	+ .02
26	----	----	----	+ .02	----	----	21	+ .04	+ .04	----	----	− .01	----	+ .03
28	----	----	+ .01	+ .03	----	----	23	+ .01	----	----	+ .01	− .03	----	----
30	----	----	+ .06	+ .04	----	----	25	+ .02	----	----	+ .01	----	----	----
Nov. 1	----	----	+ .07	+ .05	----	----	27	----	----	----	+ .01	− .01	----	----
3	----	----	----	----	+0.05	+ .01	29	----	----	----	.00	+ .01	----	----
5	----	----	----	----	+ .03	----	31	----	----	----	+ .02	.09	----	− .04
7	----	----	----	----	+ .03	----	Nov. 2	----	----	----	.00	+ .09	----	----
9	----	----	----	----	.00	----	4	----	----	----	.00	----	----	----
11	----	.00	----	----	----	----	6	----	----	+0.07	----	+ .08	----	----
13	----	+ .02	----	----	----	----	8	----	----	----	----	----	----	+ .10
15	----	− .02	----	----	----	----	10	----	----	----	----	+ .02	----	+ .02
17	----	+ .04	----	----	----	----	12	----	----	+ .04	----	----	.00	----
19	----	.00	----	----	----	----	14	----	----	+ .08	----	----	----	----
23	----	− .01	----	----	----	----	16	----	----	----	----	----	+ .03	----
25	----	− .02	----	----	----	----	18	----	----	+ .06	----	----	----	----
29	----	+ .02	----	----	----	----	20	----	----	+ .06	----	----	----	----
							22	----	----	+ .02	----	----	----	.00
							24	----	----	− .02	----	----	----	----
							26	----	----	+ .08	----	----	----	----
							28	----	----	+ .09	----	----	----	----
							30	----	----	+ .06	----	----	----	----
Mean..	+0.030	+0.010	+0.039	+0.014	+0.028	0.000	Mean..	+0.031	+0.005	+0.054	+0.013	+0.028	+0.015	+0.024

Summary of Results by Radio Stations

	Sollenberger		Moran	
	Correction	Number of Observations	Correction	Number of Observations
	s		s	
Annapolis	+0. 039	7	+0. 022	25
Bordeaux	+0. 010	10	+0. 054	10
Honolulu	+0. 015	14	+0. 020	22
Saigon	+0. 000	2	+0. 024	10
Malabar	+0. 028	4	+0. 015	2

THE TRANSMISSION TIME AND VELOCITY

By comparison of the longitudes obtained by the use of time signals from different radio stations a considerable amount of data have been obtained for the determination of the transmission times and of the velocity of the transmission. The results are given in Tables XIX and XX. The transmission times are always small quantities and are probably subject to certain systematic errors as well as considerable accidental errors. They are not affected by the errors of the clock corrections when the signals used are at about the same time and not much affected by them in any case if the clock rates are reliable. The errors to which they are subject must be due principally to systematic errors of recording the signals. Inasmuch as the velocity of transmission is supposed to be that of light, the value of the velocity obtained is in some measure a check on the accuracy or, at any rate, on the consistency of the recording devices. In the following results it has been assumed that the transmission is along the surface of the earth, on a great circle. If the transmission is above the earth, the resulting velocity would be correspondingly larger. When only one signal from each radio station was used, no weights were assigned, but where there was more than one signal from one of the radio stations a simple set of weights was used, depending on the actual number of such radio signals available on a given date.

In correcting for transmission time in the reduction of the longitude work, the corrections have been based on a transmission velocity equal to that of light — 186,300 miles per second. The following are the values used for this purpose:

TABLE XII.—*Corrections for Transmission Time*

	Annapolis and Bellevue	Bordeaux	Nauen	Saigon	Honolulu
	s	s	s	s	s
San Diego	−0. 012	−0. 031	-----	−0. 044	−0. 014
Washington	0. 000	−0. 020	-----	-----	−0. 026
Greenwich	−0. 020	−0. 002	-----	-----	-----
Paris	−0. 020	−0. 002	-----	−0. 034	-----
Algiers	−0. 022	−0. 003	−0. 006	-----	-----
Shanghai	-----	−0. 032	−0. 028	−0. 009	−0. 027

THE LONGITUDES

In determining the differences of longitude there have been used in connection with the results obtained at San Diego and Washington the times of reception of signals as prepared under the auspices of the *Commission International des Longitudes par T. S. F.* by M. GONNESSIAT for Algiers, by M. LEJAY for Shanghai, and by M. LAMBERT for Paris, and those published in "Determination of Time and Comparison with Wireless Time Signals" for Greenwich.

In accordance with the experience in the 1913–14 longitude work between Washington and Paris, it has been considered advisable to use the time signals on all nights whether or not there were astronomical observations, as the clocks under suitable conditions run with a precision to justify this procedure. However, a simple system of weights was adopted, and a somewhat less weight was assigned to nights when there was no observed clock correction at one station and a still lower weight when there was no observed clock correction at either station.

From the internal evidence it was found that the probable error of a time determination consisting of 9 or 10 star observations at San Diego or Washington was $\pm 0^s.007$ and, similarly, that the probable error of the time of reception of a radio signal set based on the mean of 10 ticks was $\pm 0^s.003$. This makes the total probable error of the sidereal time of a signal $\pm 0^s.008$ if received near the time of the star observations. This would be somewhat increased for signals received several hours or a day from the time of observations. The probable error of a difference of longitude between two stations using one set of signals would accordingly be $\pm 0^s.011$ from the internal evidence, and this would not be much reduced by the use of additional radio signals. From the final results of the San Diego-Washington observations the probable error $\pm 0^s.013$ is obtained for a single determination of longitude.

Table XXI gives the observed difference of longitude between each pair of stations for each signal available, corrected for transmission time, the mean for each date, the adopted weight for the date, and mean longitudes deduced by considering each signal separately, each sending station separately, and by dates. In general, there is but little difference in the result whatever the method of combining the individual values and the values obtained by using the dates and weights has been adopted.

Table XXII gives a recapitulation of the differences of longitude between the various pairs of stations considered and a comparison with the difference, Washington-Paris, obtained in 1913–14.

Table XXIII gives the closing errors for several combinations of stations. These are satisfactorily small, but, as has frequently been noted, this should not be regarded as a complete check on the accuracy of the results inasmuch as the same basic clock correction was usually used at a station for all the longitudes determined on a night. However, in some cases independent clock corrections were observed for different longitudes obtained the same night, as, for example, at San Diego, when observing conditions permitted, for the Algiers and Shanghai longitudes. Even then systematic errors in the clock corrections due to the observer or instrument would not be disclosed in the closing error.

Table XIII.—*Observations for Clock Corrections at San Diego*

[Not corrected for personal equation]

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
October 2.1, Hd.	h	s
α Lyræ	18.6	−32.137
110 Herculis	18.7	−32.133
ι Pegasi	22.1	−32.160
π Pegasi	22.1	−32.181
October 3.1, L.		
α Lyræ	18.6	−33.749
γ Lyræ	18.9	−33.798
β Cygni	19.5	−33.803
δ Cygni	19.7	−33.805
October 4.1, Hd.		
α Lyræ	18.6	−35.449
β Lyræ	18.8	−35.447
γ Lyræ	18.9	−35.493
51 H. Cephei, s. p.	19.1	[−35.36]
4 Cygni	19.4	−35.466
β Cygni	19.5	−35.452
14 Cygni	19.6	−35.418
δ Sagittæ	19.7	−35.469
γ Sagittæ	19.9	−35.459
b^2 Cygni	20.1	−35.436
October 5.1, L.		
γ Lyræ	18.9	−35.157
51 H. Cephei, s. p.	19.1	[−34.23]
14 Cygni	19.6	−35.109
15 Cygni	19.7	−35.134
b^2 Cygni	20.1	−35.105
32 Vulpeculæ	20.9	−35.118
σ Cygni	21.2	−35.123
1 Pegasi	21.3	−35.055
74 Cygni	21.6	−35.103
κ Pegasi	21.7	−35.117
ι Pegasi	22.1	−35.064
October 6.1, Hd.		
β Lyræ	18.8	−38.858
γ Lyræ	18.9	−38.865
51 H. Cephei, s. p.	19.1	[−39.83]
4 Cygni	19.4	−38.841
β Cygni	19.5	−38.845
δ Cygni	19.7	−38.830
γ Sagittæ	19.9	−38.810
ν Cygni	20.9	−38.794
ζ Cygni	21.2	−38.808
ρ Cygni	21.5	−38.768
κ Pegasi	21.7	−38.838
16 Pegasi	21.8	−38.862
π Pegasi	22.1	−38.808
38 Pegasi	22.4	−38.820
10 Lacertæ	22.6	−38.767
ο Andromedæ	23.0	−38.779
τ Pegasi	23.3	−38.855
39 H. Cephei	23.5	[−38.32]
ζ Andromedæ	1.3	−38.727
υ Andromedæ	1.5	−38.745
α Trianguli	1.8	−38.760
γ Andromedæ	2.0	−38.773
α Arietis	2.1	−38.788
γ Trianguli	2.2	−38.775
October 7.1, L.		
γ Lyræ	18.9	−38.553
51 H. Cephei, s. p.	19.1	[−38.92]
4 Cygni	19.4	−38.577
β Cygni	19.5	−38.560
15 Cygni	19.7	−38.508
b^2 Cygni	20.1	−38.468
24 Vulpeculæ	20.2	−38.577
ξ Cygni	21.0	−38.544
ζ Cygni	21.2	−38.481
1 Pegasi	21.3	−38.460
10 Lacertæ	22.6	−38.488
μ Pegasi	22.8	−38.464
ο Andromedæ	23.0	−38.447
ψ Pegasi	23.9	−38.497
α Andromedæ	0.1	−38.401
43 H. Cephei	1.0	[−38.16]
υ Andromedæ	1.5	−38.451
α Trianguli	1.8	−38.436
γ Trianguli	2.2	−38.465
ν Arietis	2.6	−38.357
41 Arietis	2.8	−38.451
ρ Persei	3.0	−38.410
ζ Arietis	3.2	−38.395
p Tauri	4.1	−38.393
ε Tauri	4.4	−38.438
τ Tauri	4.6	−38.316
ι Aurigæ	4.9	−38.358
October 8.1, Hd.	h	s
γ Lyræ	18.9	−38.272
β Cygni	19.5	−38.243
γ Sagittæ	19.9	−38.256
γ Cygni	20.3	−38.239
ξ Cygni	21.0	−38.207
τ Cygni	21.2	−38.225
1 H. Draconis, s. p.	21.4	[−38.60]
μ Pegasi	22.8	−38.220
ο Andromedæ	23.0	−38.214
τ Pegasi	23.3	−38.225
ι Andromedæ	23.6	−38.154
ψ Andromedæ	23.7	−38.152
ψ Pegasi	23.9	−38.232
α Andromedæ	0.1	−38.193
α Ursæ Minoris	1.6	[−39.08]
October 10.1, Hd.		
β Cygni	19.5	−37.642
14 Cygni	19.6	−37.619
δ Cygni	19.7	−37.647
γ Sagittæ	19.9	−37.654
b^2 Cygni	20.1	−37.669
24 Vulpeculæ	20.2	−37.667
γ Cygni	20.3	−37.648
41 Cygni	20.5	−37.690
1 H. Draconis, s. p.	21.4	[−37.53]
κ Pegasi	21.7	−37.645
τ Pegasi	23.3	−37.643
39 H. Cephei	23.5	[−37.69]
ψ Andromedæ	23.7	−37.625
π Andromedæ	0.5	−37.600
October 11.1, L.		
4 Cygni	19.4	−37.345
15 Cygni	19.7	−37.367
b^2 Cygni	20.1	−37.392
γ Cygni	20.3	−37.344
ε Cygni	20.7	−37.372
ν Cygni	20.9	−37.354
τ Cygni	21.2	−37.348
1 Pegasi	21.3	−37.371
1 H. Draconis, s. p.	21.4	[−37.41]
October 12.1, Hd.		
θ Lyræ	19.2	−37.149
β Cygni	19.5	−37.184
δ Cygni	19.7	−37.194
γ Sagittæ	19.9	−37.152
b^2 Cygni	20.1	−37.158
γ Cygni	20.3	−37.180
41 Cygni	20.4	−37.166
76 Draconis	20.8	[−37.33]
ζ Cygni	21.2	−37.227
October 13.1, L.		
b^2 Cygni	20.1	−36.875
24 Vulpeculæ	20.2	−36.866
41 Cygni	20.5	−36.885
α Cygni	20.7	−36.885
October 14.1, Hd.		
θ Lyræ	19.2	−36.659
4 Cygni	19.4	−36.675
β Cygni	19.5	−36.694
δ Sagittæ	19.7	−36.669
γ Sagittæ	19.9	−36.706
κ Andromedæ	23.6	−36.644
October 15.1, L.		
β Cygni	19.5	−36.445
14 Cygni	19.6	−36.385
δ Sagittæ	19.7	−36.365
γ Sagittæ	19.9	−36.380
b^2 Cygni	20.1	−36.447
γ Cygni	20.3	−36.366
α Cygni	20.6	−36.388
ξ Cygni	21.0	−36.374
1 H. Draconis, s. p.	21.4	[−36.62]
κ Pegasi	21.7	−36.397
16 Pegasi	21.8	−36.397
ι Andromedæ	23.6	−36.345
σ Andromedæ	0.2	−36.368
δ Andromedæ	0.6	−36.393
μ Andromedæ	0.9	−36.363
October 16.1, Hd.	h	s
β Cygni	19.5	−36.223
δ Cygni	19.7	−36.142
γ Sagittæ	19.9	−36.201
b^2 Cygni	20.1	−36.136
γ Cygni	20.3	−36.150
41 Cygni	20.4	−36.220
α Cygni	20.6	−36.150
ε Cygni	20.7	−36.197
1 H. Draconis, s. p.	21.4	[−36.53]
ρ Cygni	21.5	−36.108
λ Pegasi	22.7	−36.125
μ Pegasi	22.8	−36.166
October 17.1, L.		
14 Cygni	19.6	−35.902
b^2 Cygni	20.1	−35.929
24 Vulpeculæ	20.2	−36.002
41 Cygni	20.4	−35.907
α Cygni	20.7	−36.019
October 18.1, Hd.		
4 Cygni	19.4	−37.886
β Cygni	19.5	−37.850
δ Cygni	19.7	−37.800
γ Sagittæ	19.9	−37.852
γ Cygni	20.3	−37.815
α Cygni	20.6	−37.817
ε Cygni	20.7	−37.797
ν Cygni	20.9	−37.807
ξ Cygni	21.0	−37.849
1 Pegasi	21.3	−37.813
30 H. Camelop. s. p.	22.4	[−38.13]
October 19.1, L.		
γ Sagittæ	19.9	−37.575
b^2 Cygni	20.1	−37.526
24 Vulpeculæ	20.2	−37.595
γ Cygni	20.3	−37.569
α Cygni	20.6	−37.577
October 20.1, Hd.		
β Cygni	19.5	−37.495
δ Cygni	19.7	−37.452
γ Sagittæ	19.9	−37.432
b^2 Cygni	20.1	−37.488
γ Cygni	20.3	−37.457
41 Cygni	20.4	−37.453
α Cygni	20.6	−37.415
ε Cygni	20.7	−37.449
ξ Cygni	21.0	−37.429
ζ Cygni	21.2	−37.463
1 H. Draconis, s. p.	21.4	[−37.73]
October 21.1, Hd.		
δ Cygni	19.7	−37.191
γ Sagittæ	19.9	−37.242
b^2 Cygni	20.1	−37.227
γ Cygni	20.3	−37.189
41 Cygni	20.4	−37.255
α Cygni	20.6	−37.254
ε Cygni	20.7	−37.244
α Ursæ Minoris	1.6	[−38.20]
α Trianguli	1.8	−37.210
γ Andromedæ	2.0	−37.233
α Arietis	2.1	−37.186
γ Trianguli	2.2	−37.213
ν Arietis	2.6	−37.177
41 Arietis	2.8	−37.238
ρ Persei	3.0	−37.200
β Persei	3.1	−37.201
δ Arietis	3.1	−37.191
ζ Arietis	3.2	−37.189
October 22.1, L.		
γ Sagittæ	19.9	−36.978
γ Cygni	20.3	−37.017
41 Cygni	20.4	−37.010
α Cygni	20.6	−37.059
32 Vulpeculæ	20.9	−37.047
ξ Cygni	21.0	−37.043
σ Cygni	21.2	−37.079
16 Pegasi	21.8	−37.049
π Pegasi	22.1	−37.036
30 H. Camelop., s. p.	22.4	[−36.98]
10 Lacertæ	22.6	−37.044
α Ursæ Minoris	1.6	[−34.55]
γ Andromedæ	2.0	−37.026

Table XIII.—*Observations for Clock Corrections at San Diego*—Continued

[Not corrected for personal equation]

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
October 22.1, L.—Contd.	h	s
41 Arietis	2.8	−37.035
ε Arietis	2.9	−36.974
β Persei	3.1	−37.001
ο Persei	3.7	−36.942
η Tauri	3.7	−36.932
October 26.1, L.		
b^2 Cygni	20.1	−36.546
24 Vulpeculæ	20.2	−36.514
γ Cygni	20.3	−36.527
α Cygni	20.6	−36.585
ε Cygni	20.7	−36.507
ν Cygni	20.9	−36.544
ξ Cygni	21.0	−36.520
October 27.1, Hd.		
δ Cygni	19.7	−40.426
γ Sagittæ	19.9	−40.400
b^2 Cygni	20.1	−40.392
γ Cygni	20.3	−40.362
41 Cygni	20.4	−40.402
α Cygni	20.6	−40.423
ε Cygni	20.7	−40.434
October 28.1, L.		
δ Cygni	19.7	−40.254
γ Sagittæ	19.9	−40.227
b^2 Cygni	20.1	−40.285
24 Vulpeculæ	20.2	−40.257
γ Cygni	20.3	−40.281
41 Cygni	20.4	−40.213
α Cygni	20.6	−40.259
76 Draconis	20.8	[−40.34]
ζ Cygni	21.2	−40.242
1 Pegasi	21.3	−40.253
1 H. Draconis, s. p.	21.4	[−40.16]
κ Pegasi	21.7	−40.207
October 29.1, Hd.		
γ Sagittæ	19.9	−40.153
b^2 Cygni	20.1	−40.168
24 Vulpeculæ	20.2	−40.196
γ Cygni	20.3	−40.084
41 Cygni	20.4	−40.184
α Cygni	20.6	−40.161
76 Draconis	20.8	[−40.37]
ξ Cygni	21.0	−40.113
ζ Cygni	21.2	−40.191
1 Pegasi	21.3	−40.179
October 30.1, L.		
b^2 Cygni	20.1	−40.036
24 Vulpeculæ	20.2	−40.076
41 Cygni	20.4	−40.064
α Cygni	20.6	−40.075
ε Cygni	20.7	−40.056
ν Cygni	20.9	−40.020
ξ Cygni	21.0	−40.034
ζ Cygni	21.2	−40.086
1 Pegasi	21.3	−40.071
1 H. Draconis, s. p.	21.4	[−39.99]
α Ursæ Minoris	1.6	[−40.97]
α Trianguli	1.8	−40.018
ρ Persei	3.0	−40.065
δ Arietis	3.1	−40.021
τ Arietis	3.3	−40.028
η Tauri	3.7	−39.992
ξ Persei	3.9	−40.052
p Tauri	4.1	−39.997
τ Tauri	4.6	−39.954
β Aurigæ	4.9	−40.006
October 31.1, Hd.		
γ Cygni	20.3	−39.954
41 Cygni	20.4	−40.018
α Cygni	20.6	−40.000
76 Draconis	20.8	[−40.05]
ξ Cygni	21.0	−39.956
ζ Cygni	21.2	−39.937
1 Pegasi	21.3	−39.919
1 H. Draconis, s. p.	21.4	[−40.30]
74 Cygni	21.6	−39.934
κ Pegasi	21.7	−39.962
16 Pegasi	21.8	−39.985
ρ Persei	3.0	−39.912
β Persei	3.1	−39.967
δ Arietis	3.1	−40.003
ζ Arietis	3.2	−40.020
ο Persei	3.7	−40.033

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
October 31.1, Hd.—Contd.	h	s
η Tauri	3.7	−40.033
ε Persei	3.9	−40.052
A Tauri	4.0	−39.998
54 Persei	4.3	−39.946
ε Tauri	4.4	−39.953
m Persei	4.5	−39.854
November 1.1, L.		
ξ Cygni	21.0	−39.864
ζ Cygni	21.2	−39.911
σ Cygni	21.2	−39.843
1 Pegasi	21.3	−39.805
1 H. Draconis, s. p.	21.4	[−39.63]
74 Cygni	21.6	−39.847
κ Pegasi	21.7	−39.868
π Pegasi	22.1	−39.805
10 Lacertæ	22.6	−39.882
μ Pegasi	22.8	−39.832
41 Arietis	2.8	−39.842
Groomb. 2283 s. p.	3.0	[−38.35]
τ Arietis	3.3	−39.789
η Tauri	3.7	−39.836
ξ Persei	3.9	−39.823
p Tauri	4.1	−39.827
τ Tauri	4.6	−39.828
ζ Aurigæ	5.0	−39.838
μ Aurigæ	5.1	−39.794
1 Geminorum	6.0	−39.866
51 Aurigæ	6.6	−39.838
November 2.1, Hd.		
α Cygni	20.6	−39.761
76 Draconis	20.8	[−39.43]
ξ Cygni	21.0	−39.771
ζ Cygni	21.2	−39.804
1 Pegasi	21.3	−39.805
1 H. Draconis	21.4	[−39.87]
74 Cygni	21.6	−39.734
κ Pegasi	21.7	−39.806
16 Pegasi	21.8	−39.863
ι Pegasi	22.1	−39.799
10 Lacertæ	22.6	−39.769
ρ Persei	3.0	−39.794
δ Arietis	3.1	−39.750
τ Arietis	3.3	−39.751
σ Persei	3.4	−39.740
η Tauri	3.7	−39.760
ε Persei	3.9	−39.767
A Tauri	4.0	−39.750
Groomb. 750	4.2	[−39.78]
m Persei	4.5	−39.744
τ Tauri	4.6	−39.784
November 3.1, L.		
ε Cygni	20.7	−39.692
32 Vulpeculæ	20.9	−39.750
ξ Cygni	21.0	−39.728
ζ Cygni	21.2	−39.638
16 Pegasi	21.8	−39.709
10 Lacertæ	22.6	−39.713
λ Pegasi	22.7	−39.690
ο Andromedæ	23.0	−39.689
τ Pegasi	23.3	−39.735
39 H. Cephei	23.5	[−39.70]
σ Persei	3.4	−39.664
ο Persei	3.7	−39.687
27 Tauri	3.7	−39.674
ε Persei	3.9	−39.691
A Tauri	4.0	−39.678
54 Persei	4.3	−39.675
ε Tauri	4.4	−39.652
τ Tauri	4.6	−39.651
ε Ursæ Minoris, s. p.	4.9	[−39.39]
θ Aurigæ	5.9	−39.721
η Geminorum	6.2	−39.670
November 4.1, Hd.		
α Cygni	20.6	−39.592
ε Cygni	20.7	−39.593
November 5.1, L.		
ε Cygni	20.7	−39.539
32 Vulpeculæ	20.9	−39.572
ξ Cygni	21.0	−39.590
ζ Cygni	21.2	−39.566
1 Pegasi	21.3	−39.565
ρ Cygni	21.5	−39.550
μ Pegasi	22.8	−39.548
Bradley 3058	22.9	[−40.48]
ι Andromedæ	23.6	−39.596
α Andromedæ	0.1	−39.541

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
November 6.1, Hd.	h	s
ε Cygni	20.7	−39.411
32 Vulpeculæ	20.9	−39.451
σ Cygni	21.2	−39.407
κ Pegasi	21.7	−39.504
16 Pegasi	21.8	−39.577
ι Pegasi	22.1	−39.572
π Pegasi	22.1	−39.473
November 7.1, L.		
α Cygni	20.6	−39.492
ε Cygni	20.7	−39.447
32 Vulpeculæ	20.9	−39.483
ξ Cygni	21.0	−39.397
ζ Cygni	21.2	−39.418
1 Pegasi	21.3	−39.391
1 H. Draconis, s. p.	21.4	[−39.29]
ι Pegasi	22.1	−39.373
β Pegasi	23.0	−39.350
November 8.1, Hd.		
α Cygni	20.6	−39.212
ε Cygni	20.7	−39.266
32 Vulpeculæ	20.9	−39.265
ξ Cygni	21.0	−39.252
ζ Cygni	21.2	−39.273
1 Pegasi	21.3	−39.276
κ Pegasi	21.7	−39.270
November 9.1, L.		
α Cygni	20.6	−39.290
ε Cygni	20.7	−39.246
ν Cygni	20.9	−39.244
ξ Cygni	21.0	−39.297
ζ Cygni	21.2	−39.247
1 Pegasi	21.3	−39.296
ρ Cygni	21.5	−39.189
κ Pegasi	21.7	−39.227
ι Pegasi	22.1	−39.241
π Pegasi	22.1	−39.279
β Pegasi	23.0	−39.305
43 H. Cephei	1.0	[−38.68]
υ Piscium	1.3	−39.237
α Ursæ Minoris	1.6	[−38.21]
α Trianguli	1.8	−39.210
ο Persei	3.7	−39.313
τ Tauri	4.6	−39.213
η Aurigæ	5.0	−39.243
α Aurigæ	5.2	−39.244
β Tauri	5.4	−39.225
η Geminorum	6.2	−39.195
μ Geminorum	6.3	−39.233
ε Geminorum	6.7	−39.255
November 10.1, Hd.		
ε Cygni	20.7	−43.215
32 Vulpeculæ	20.9	−43.243
ξ Cygni	21.0	−43.266
ζ Cygni	21.2	−43.318
1 Pegasi	21.3	−43.272
1 H. Draconis, s. p.	21.4	[−43.69]
κ Pegasi	21.7	−43.289
16 Pegasi	21.8	−43.324
ι Pegasi	22.1	−43.266
π Pegasi	22.1	−43.259
30 H. Camelop., s. p.	22.4	[−42.80]
τ Pegasi	23.3	−43.319
39 H. Cephei	23.5	[−43.10]
ψ Andromedæ	23.7	−43.248
η Tauri	3.7	−43.243
ε Persei	3.9	−43.251
A Tauri	4.0	−43.291
p Tauri	4.1	−43.245
54 Persei	4.3	−43.246
ε Tauri	4.4	−43.263
τ Tauri	4.6	−43.230
ε Ursæ Minoris, s. p.	4.9	[−43.33]
η Aurigæ	5.0	−43.257
μ Aurigæ	5.1	−43.317
α Aurigæ	5.2	−43.275
November 11.1, L.		
ι Andromedæ	23.6	−43.239
φ Pegasi	23.8	−43.174
ψ Pegasi	23.9	−43.218
α Andromedæ	0.1	−43.181
σ Andromedæ	0.2	−43.234
π Andromedæ	0.5	−43.166
μ Andromedæ	0.9	−43.199
β Andromedæ	1.1	−43.192

TABLE XIII.—*Observations for Clock Corrections at San Diego*—Continued

[Not corrected for personal equation]

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
November 11.1, L.—Contd.	h	s
α Ursæ Minoris	1.6	[−44.54]
β Arietis	1.8	−43.169
β Trianguli	2.1	−43.244
o Persei	3.7	−43.159
η Tauri	3.7	−43.193
p Tauri	4.1	−43.205
54 Persei	4.3	−43.203
ε Tauri	4.4	−43.196
τ Tauri	4.6	−43.180
ε Ursæ Minoris, s. p.	4.9	[−43.17]
μ Aurigæ	5.1	−43.227
β Tauri	5.4	−43.230
ζ Tauri	5.6	−43.211
1 Geminorum	6.0	−43.183
November 12.1, Hd.		
ρ Cygni	21.5	−43.194
74 Cygni	21.6	−43.179
κ Pegasi	21.7	−43.233
16 Pegasi	21.8	−43.247
ι Pegasi	22.1	−43.216
π Pegasi	22.1	−43.241
30 H. Camelop., s. p.	22.4	[−43.56]
10 Lacertæ	22.6	−43.222
η Pegasi	22.7	−43.191
ι Andromedæ	23.6	−43.178
November 13.4, L.		
ζ Persei	3.8	−55.132
ε Persei	3.9	−55.118
A Tauri	4.0	−55.160
54 Persei	4.3	−55.169
ε Tauri	4.4	−55.110
τ Tauri	4.6	−55.125
ε Ursæ Minoris, s. p.	4.9	[−54.97]
α Aurigæ	5.2	−55.141
ζ Tauri	5.6	−55.087
ν Aurigæ	5.8	−55.130
δ Ursæ Minoris, s. p.	5.9	[−54.55]
ι Geminorum	6.4	55.136
November 14.1, Hd.		
ζ Cygni	21.2	−55.090
1 Pegasi	21.3	−55.132
1 H. Draconis, s. p.	21.4	[−54.89]
74 Cygni	21.6	−55.086
κ Pegasi	21.7	−55.140
16 Pegasi	21.8	−55.172
ι Pegasi	22.1	−55.153
π Pegasi	22.1	−55.127
10 Lacertæ	22.6	−55.152
o Andromedæ	23.0	−55.079
39 H. Cephei	23.5	[−55.11]
ψ Andromedæ	23.7	−55.116
ψ Pegasi	23.8	−55.078
ζ Persei	3.8	−57.132
ε Persei	3.9	−57.096
A Tauri	4.0	−57.102
Gr. 750	4.2	[−57.44]
ε Tauri	4.4	−57.100
m Persei	4.5	−57.104
τ Tauri	4.6	−57.121
ε Ursæ Minoris, s. p.	4.9	[−56.94]
η Aurigæ	5.0	−57.055
μ Aurigæ	5.1	−57.095
λ Aurigæ	5.2	−57.072
β Tauri	5.4	−57.073
χ Aurigæ	5.5	−57.132
November 15.1, L.		
ζ Cygni	21.2	−61.059
1 Pegasi	21.3	−61.065
1 H. Draconis, s. p.	21.4	[−61.08]
16 Pegasi	21.8	−61.079
π Pegasi	22.1	−61.053
30 H. Camelop., s. p.	22.2	[−61.10]
10 Lacertæ	22.6	−61.112
υ Pegasi	23.4	−61.053
ι Andromedæ	23.6	−61.046
ψ Andromedæ	23.7	−61.032
α Andromedæ	0.1	−61.070
σ Andromedæ	0.2	−61.047
ε Persei	3.9	−61.046
p Tauri	4.1	−61.040
54 Persei	4.3	−61.057
ε Tauri	4.4	−61.017
τ Tauri	4.6	−61.041
ε Ursæ Minoris, s. p.	4.9	[−61.25]
η Aurigæ	5.0	−61.065

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
November 15.1, L.—Contd.	h	s
λ Aurigæ	5.2	−61.137
χ Aurigæ	5.5	−61.042
Groomb 944	5.6	[−60.90]
θ Aurigæ	5.9	−61.097
ν Geminorum	6.4	−61.020
November 16.1, Hd.		
1 Pegasi	21.3	−61.043
ρ Cygni	21.5	−60.982
κ Pegasi	21.7	−61.004
16 Pegasi	21.8	−61.081
ι Pegasi	22.1	−61.057
π Pegasi	22.1	−61.044
30 H. Camelop., s. p.	22.4	[−61.33]
10 Lacertæ	22.6	−61.054
λ Pegasi	22.7	−61.017
o Andromedæ	23.0	−64.998
τ Pegasi	23.3	−65.001
39 H. Cephei	23.5	[−65.66]
κ Andromedæ	23.6	−65.085
ψ Andromedæ	23.7	−65.032
Groomb. 642	3.7	[−70.61]
A Tauri	4.0	−71.056
p Tauri	4.1	−71.074
54 Persei	4.3	−71.039
ε Tauri	4.4	−73.002
m Persei	4.5	−72.981
τ Tauri	4.6	−73.004
ε Ursæ Minoris, s. p.	4.9	[−72.99]
η Aurigæ	5.0	−73.042
μ Aurigæ	5.1	−73.089
λ Aurigæ	5.2	−73.046
β Tauri	5.4	−73.049
ζ Tauri	5.6	−72.997
ν Aurigæ	5.8	−73.048
November 17.1, L.		
κ Pegasi	21.7	−73.043
16 Pegasi	21.8	−73.063
ι Pegasi	22.1	−73.007
π Pegasi	22.1	−73.005
10 Lacertæ	22.6	−73.012
μ Pegasi	22.8	−73.015
ψ Andromedæ	23.7	−73.013
ψ Pegasi	23.9	−72.995
σ Andromedæ	0.2	−73.016
π Andromedæ	0.5	−72.964
32? H. Camelop., s. p.	0.8	[−73.32]
43 H. Cephei	1.0	[−72.62]
ω Andromedæ	1.4	−73.021
i Tauri	4.8	−72.985
ι Aurigæ	4.9	−72.996
η Aurigæ	5.0	−72.990
μ Aurigæ	5.1	−72.983
β Tauri	5.4	−72.985
χ Aurigæ	5.5	−73.046
ζ Tauri	5.6	−73.003
ν Aurigæ	5.8	−73.008
δ Ursæ Minoris, s. p.	5.9	[−72.74]
ψ.5 Aurigæ	6.7	−72.998
ζ Geminorum	7.0	−72.978
November 18.1, Hd.		
ρ Cygni	21.5	−72.940
κ Pegasi	21.7	−72.940
ι Pegasi	22.1	−72.964
π Pegasi	22.1	−72.981
η Pegasi	22.7	−72.947
μ Pegasi	22.8	−72.963
o Andromedæ	23.0	−72.973
ι Andromedæ	23.6	−72.985
ψ Andromedæ	23.7	−72.944
α Andromedæ	0.1	−72.999
Bradley 1672, s. p.	0.2	[−74.99]
43 H. Cephei	1.0	[−72.39]
τ Piscium	1.1	−72.975
Groomb. 642	3.7	[−73.04]
p Tauri	4.1	−72.963
54 Persei	4.3	−72.924
ε Tauri	4.4	−72.956
m Persei	4.5	−72.940
τ Tauri	4.6	−72.953
i Tauri	4.8	−73.044
ζ Aurigæ	5.0	−72.910
η Aurigæ	5.0	−72.916
μ Aurigæ	5.1	−72.927
β Tauri	5.4	−72.991
χ Aurigæ	5.5	−72.939

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
November 19.1, L.	h	s
74 Cygni	21.6	−72.870
κ Pegasi	21.7	−72.936
16 Pegasi	21.8	−72.955
ι Pegasi	22.1	−72.949
π Pegasi	22.1	−72.898
10 Lacertæ	22.6	−72.970
μ Pegasi	22.8	−72.963
φ Pegasi	23.8	−72.970
ψ Pegasi	23.9	−72.990
22 Andromedæ	0.1	−72.914
43 H. Cephei	1.0	[−72.33]
α Ursæ Minoris	1.6	[−72.80]
A Tauri	4.0	−72.921
ε Tauri	4.4	−72.898
τ Tauri	4.6	−72.937
ι Aurigæ	4.9	−72.926
ε Aurigæ	4.9	−72.880
η Aurigæ	5.0	−72.895
α Aurigæ	5.2	−72.886
β Tauri	5.4	−72.913
ζ Tauri	5.6	−72.853
β Aurigæ	5.9	−72.985
November 20.1, Hd.		
10 Lacertæ	22.6	−72.908
λ Pegasi	22.7	−72.909
μ Pegasi	22.8	−72.925
o Andromedæ	23.0	−72.930
υ Pegasi	23.4	−72.946
α Andromedæ	0.1	−72.907
σ Andromedæ	0.2	−72.954
π Andromedæ	0.5	−72.945
ζ Andromedæ	0.7	−72.910
43 H. Cephei	1.0	[−72.58]
β Andromedæ	1.1	−72.969
A Tauri	4.0	−72.878
ε Tauri	4.4	−72.903
ι Aurigæ	4.9	−72.917
η Aurigæ	5.0	−72.917
μ Aurigæ	5.1	−72.951
α Aurigæ	5.2	−72.919
β Tauri	5.4	−72.951
ζ Tauri	5.6	−72.898
ν Aurigæ	5.8	−72.885
θ Aurigæ	5.9	−72.879
1 Geminorum	6.0	−72.912
November 21.1, L.		
κ Pegasi	21.7	−72.893
16 Pegasi	21.8	−72.944
ι Pegasi	22.1	−72.936
π Pegasi	22.1	−72.881
30 H. Camelop., s. p.	22.4	[−73.18]
10 Lacertæ	22.6	−72.878
μ Pegasi	22.8	−72.883
o Andromedæ	23.0	−72.891
κ Andromedæ	23.6	−72.899
ψ Pegasi	23.8	−72.916
22 Andromedæ	0.1	−72.851
43 H. Cephei	1.0	[−72.98]
p Tauri	4.1	−72.945
ε Tauri	4.4	−74.935
τ Tauri	4.6	−74.964
ε Ursæ Minoris, s. p.	4.9	[−74.83]
η Aurigæ	5.0	−74.817
β Tauri	5.4	−74.892
ν Aurigæ	5.8	−74.870
β Aurigæ	5.9	−74.901
η Geminorum	6.2	−74.908
θ Geminorum	6.8	−74.848
51 H. Cephei	7.1	[−74.67]
64 Aurigæ	7.2	−74.938
November 22.1, Hd.		
ρ Cygni	21.5	−74.890
κ Pegasi	21.7	−74.874
16 Pegasi	21.8	−74.863
ι Pegasi	22.1	−74.887
π Pegasi	22.1	−74.886
30 H. Camelop., s. p.	22.4	[−74.80]
10 Lacertæ	22.6	−74.911
λ Pegasi	22.7	−74.892
μ Pegasi	22.8	−74.920
o Andromedæ	23.0	−74.932
τ Pegasi	23.3	−74.893
η Tauri	3.7	−74.867
ε Persei	3.9	−74.922
A Tauri	4.0	−74.940
p Tauri	4.1	−74.925

Table XIII.—*Observations for Clock Corrections at San Diego*—Continued

[Not corrected for personal equation]

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
November 22.1, Hd.—Contd.	h	s
ε Tauri	4.4	−74.826
τ Tauri	4.6	−74.834
ι Aurigæ	4.9	−74.873
η Aurigæ	5.0	−74.887
μ Aurigæ	5.1	−74.837
α Aurigæ	5.2	−74.915
β Tauri	5.4	−74.878
November 24.1, Hd.		
κ Pegasi	21.7	−78.856
16 Pegasi	21.8	−78.869
ι Pegasi	22.1	−78.859
π Pegasi	22.1	−78.857
30 H. Camelop., s. p.	22.4	[−78.53]
10 Lacertæ	22.6	−78.840
λ Pegasi	22.7	−78.837
μ Pegasi	22.8	−78.882
ο Andromedæ	23.0	−78.759
39 H. Cephei	23.5	[−78.40]
ψ Andromedæ	23.7	−78.801
November 25.2, L.		
ζ Andromedæ	0.7	−88.829
μ Andromedæ	0.9	−88.840
β Andromedæ	1.1	−88.814
υ Piscium	1.3	−88.834
ω Andromedæ	1.4	−88.799
ν Arietis	2.6	−88.753
41 Arietis	2.8	−88.802
ρ Persei	3.0	−88.789
β Persei	3.1	−88.801
ζ Arietis	3.2	−88.784
November 26.1, Hd.		
16 Pegasi	21.8	−88.882
ι Pegasi	22.1	−88.858
π Pegasi	22.1	−88.776
30 H. Camelop., s. p.	22.4	[−87.99]
10 Lacertæ	22.6	−88.822
λ Pegasi	22.7	−88.776
μ Pegasi	22.8	−88.799
ο Andromedæ	23.0	−88.776
τ Pegasi	23.3	−88.769
39 H. Cephei	23.5	[−89.58]
ι Andromedæ	23.6	−88.798
ε Tauri	4.4	−88.716

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
November 26.1, Hd.—Contd.	h	s
τ Tauri	4.6	−88.703
ι Aurigæ	4.9	−88.785
ε Aurigæ	4.9	−88.717
μ Aurigæ	5.1	−88.765
β Tauri	5.4	−88.751
ν Aurigæ	5.8	−88.742
θ Aurigæ	5.9	−88.769
1 Geminorum	6.0	−88.762
November 28.1, Hd.		
16 Pegasi	21.8	−38.812
ι Pegasi	22.1	−38.835
π Pegasi	22.1	−38.733
30 H. Camelop., s. p.	22.4	[−38.23]
10 Lacertæ	22.6	−38.801
λ Pegasi	22.7	−38.798
μ Pegasi	22.8	−38.828
ο Andromedæ	23.0	−38.844
τ Pegasi	23.3	−38.795
39 H. Cephei	23.5	[−38.59]
ψ Andromedæ	23.7	−38.847
ψ Pegasi	23.9	−38.801
τ Tauri	4.6	−40.763
i Tauri	4.8	−40.767
ε Aurigæ	4.9	−40.702
η Aurigæ	5.0	−40.758
μ Aurigæ	5.1	−40.784
α Aurigæ	5.2	−40.718
β Tauri	5.4	−40.774
ζ Tauri	5.6	−40.736
ν Aurigæ	5.8	−40.718
θ Aurigæ	5.9	−40.734
η Geminorum	6.2	−40.757
November 29.1, L.		
10 Lacertæ	22.6	−56.766
μ Pegasi	22.8	−56.741
ο Andromedæ	23.0	−56.729
τ Pegasi	23.3	−56.750
υ Pegasi	23.4	−56.726
72 Pegasi	23.5	−56.715
ι Andromedæ	23.6	−56.715
φ Pegasi	23.8	−56.649
22 Andromedæ	0.1	−56.724
ρ Andromedæ	0.3	−56.782

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
November 29.1, L.—Contd.	h	s
41 Arietis	2.8	−56.781
ρ Persei	3.0	−56.713
ο Persei	3.7	−56.705
ζ Persei	3.8	−56.714
ε Tauri	4.4	−56.709
τ Tauri	4.6	−56.700
ε Ursæ Minoris, s. p.	4.9	[−56.70]
η Aurigæ	5.0	−56.667
α Aurigæ	5.2	−56.680
β Tauri	5.4	−56.718
November 30.1, Hd.		
ι Pegasi	22.1	−56.690
π Pegasi	22.1	−56.647
30 H. Camelop., s. p.	22.4	[−56.29]
10 Lacertæ	22.6	−56.713
λ Pegasi	22.7	−56.679
μ Pegasi	22.8	−56.699
ο Andromedæ	23.0	−56.666
τ Pegasi	23.3	−56.724
39 H. Cephei	23.5	[−57.77]
ι Andromedæ	23.6	−56.682
τ Tauri	4.6	−56.676
ι Aurigæ	4.9	−56.723
η Aurigæ	5.0	−56.626
December 1.1, L.		
30 H. Camelop., s. p.	22.4	[−56.84]
10 Lacertæ	22.6	−56.620
λ Pegasi	22.7	−56.627
μ Pegasi	22.8	−56.629
ο Andromedæ	23.0	−56.593
τ Pegasi	23.3	−56.654
υ Pegasi	23.4	−56.667
ι Andromedæ	23.6	−56.613
ψ Andromedæ	23.7	−56.627
ψ Pegasi	23.9	−56.678
α Andromedæ	0.1	−56.664
η Tauri	3.7	−56.572
ε Persei	3.9	−56.567
ε Tauri	4.4	−56.589
ε Aurigæ	4.9	−56.606
μ Aurigæ	5.1	−56.568
β Tauri	5.4	−56.618
ζ Tauri	5.6	−56.552

Table XIV.—*Observations for Clock Corrections at Washington*

[Not corrected for personal equation]

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
October 3.1, Ws.	h	s
ο Cygni	20.2	−18.843
41 Cygni	20.4	−18.883
α Cygni	20.6	−18.876
76 Draconis	20.8	[−18.38]
ξ Cygni	21.0	−18.885
ζ Cygni	21.2	−18.861
g Cygni	21.4	−18.855
74 Cygni	21.6	−18.833
π² Cygni	21.7	−18.799
16 Pegasi	21.8	−18.970
October 4.2, Ws.		
ψ Andromedæ	23.7	−18.803
ψ Pegasi	23.9	−18.822
α Andromedæ	0.1	−18.857
Bradley 1672, s. p.	0.2	[−16.67]
ν Andromedæ	0.8	−18.787
μ Andromedæ	0.9	−18.777
43 H Cephei	1.0	[−17.24]
β Andromedæ	1.1	−18.796
υ Piscium	1.3	−18.791
ω Andromedæ	1.4	−18.805
υ Andromedæ	1.5	−18.766

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
October 5.2, Ws.	h	s
ο Cassiopeiæ	0.7	−18.739
32² H. Camelop., s. p.	0.8	[−19.06]
43 H. Cephei	1.0	[−18.39]
β Andromedæ	1.1	−18.751
υ Piscium	1.3	−18.769
ω Andromedæ	1.4	−18.758
υ Andromedæ	1.5	−18.718
α Trianguli	1.8	−18.707
γ Andromedæ, *pr*	2.0	−18.736
β Trianguli	2.1	−18.785
γ Trianguli	2.2	−18.756
October 6.0, Ws.		
25 H. Camelop., s. p.	19.3	[−18.48]
β Cygni	19.5	−18.715
θ Cygni	19.6	−18.702
15 Cygni	19.7	−18.739
γ Sagittæ	19.9	−18.728
ο Cygni	20.2	−18.760
γ Cygni	20.3	−18.723
41 Cygni	20.4	−18.728
α Cygni	20.6	−18.710
76 Draconis	20.8	[−18.87]
ξ Cygni	21.0	−18.721

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
October 7.2, Ws.	h	s
ψ Pegasi	23.9	−18.686
22 Andromedæ	0.1	−18.705
Bradley 1672, s. p.	0.2	[−17.95]
δ Andromedæ	0.6	−18.726
ν Andromedæ	0.8	−18.710
43 H. Cephei	1.0	[−18.20]
β Andromedæ	1.1	−18.675
υ Piscium	1.3	−18.688
ω Andromedæ	1.4	−18.722
υ Andromedæ	1.5	−18.659
φ Persei	1.7	−18.624
October 8.2, Ws.		
22 Andromedæ	0.1	−18.644
Bradley 1672, s. p.	0.2	[−16.73]
μ Andromedæ	0.9	−18.659
43 H. Cephei	1.0	[−18.70]
β Andromedæ	1.1	−18.678
υ Piscium	1.3	−18.618
ω Andromedæ	1.4	−18.699
υ Andromedæ	1.5	−18.634
φ Persei	1.7	−18.639
α Trianguli	1.8	−18.675
γ Andromedæ, *pr*	2.0	−18.670

Table XIV.—*Observations for Clock Corrections at Washington*—Continued

[Not corrected for personal equation]

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
October 9.0, Ws.	h	s
15 Cygni	19.7	−18.676
γ Sagittæ	19.9	−18.617
o Cygni *seq*	20.2	−18.625
γ Cygni	20.3	−18.576
41 Cygni	20.4	−18.619
α Cygni	20.6	−18.611
76 Draconis	20.8	[−18.47]
32 Vulpeculæ	20.9	−18.647
ξ Cygni	21.0	−18.648
ζ Cygni	21.2	−18.603
October 10.0, Ws.		
θ Cygni	19.6	−18.547
15 Cygni	19.7	−18.601
γ Sagittæ	19.9	−18.574
o Cygni	20.2	−18.536
γ Cygni	20.3	−18.500
41 Cygni	20.4	−18.598
ε Cygni	20.7	−18.595
76 Draconis	20.8	[−18.43]
ξ Cygni	21.0	−18.541
ζ Cygni	21.2	−18.561
1 H. Draconis, s. p	21.4	[−18.61]
October 11.2, Ws.		
π Andromedæ	0.5	−18.534
o Cassiopeiæ	0.7	−18.475
υ Piscium	1.3	−18.479
ω Andromedæ	1.4	−18.514
υ Andromedæ	1.5	−18.478
α Trianguli	1.8	−18.502
γ Andromedæ, *pr*	2.0	−18.437
β Trianguli	2.1	−18.531
October 15.0, Ws.		
o Cygni, *seq*	20.2	−18.258
γ Cygni	20.3	−18.249
41 Cygni	20.4	−18.243
α Cygni	20.6	−18.249
76 Draconis	20.8	[−18.05]
32 Vulpeculæ	20.9	−18.279
ξ Cygni	21.0	−18.268
ζ Cygni	21.2	−18.282
σ Cygni	21.2	−18.266
1 H. Draconis, s. p	21.4	[−18.19]
16 Pegasi	21.8	−18.287
October 16.0, Ws.		
o Cygni, *seq*	20.2	−18.231
γ Cygni	20.3	−18.205
41 Cygni	20.4	−18.217
α Cygni	20.6	−18.198
76 Draconis	20.8	[−18.18]
32 Vulpeculæ	20.9	−18.229
ξ Cygni	21.0	−18.196
ζ Cygni	21.2	−18.218
σ Cygni	21.2	−18.239
1 H. Draconis, s. p	21.4	[−18.11]
16 Pegasi	21.8	−18.269
ι Pegasi	22.1	−18.221
October 18.0, Ws.		
o Cygni	20.2	−18.077
γ Cygni	20.3	−18.084
41 Cygni	20.4	−18.129
α Cygni	20.6	−18.091
76 Draconis	20.8	[−17.96]
ξ Cygni	21.0	−18.066
ζ Cygni	21.2	−18.098
1 H. Draconis, s. p	21.4	[−17.77]
π² Cygni	21.7	−18.120
ι Pegasi	22.1	−18.090
October 19.0, Ws.		
γ Cygni	20.3	−18.022
α Cygni	20.6	−18.037
ε Cygni	20.7	−18.104
ξ Cygni	21.0	−18.036
16 Pegasi	21.8	−18.117
ι Pegasi	22.1	−18.087
30 H. Camelop., s. p	22.4	[−18.34]
α Lacertæ	22.5	−18.026
η Pegasi	22.7	−18.064
μ Pegasi	22.8	−18.046

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
October 20.0, Ws.	h	s
γ Cygni	20.3	−17.969
41 Cygni	20.4	−18.053
α Cygni	20.6	−17.977
76 Draconis	20.8	[−18.04]
32 Vulpeculæ	20.9	−18.031
ξ Cygni	21.0	−18.024
ζ Cygni	21.2	−18.024
74 Cygni	21.6	−17.999
π² Cygni	21.7	−18.000
ι Pegasi	22.1	−18.027
30 H. Camelop., s. p	22.4	[−17.92]
October 21.0, Ws.		
α Cygni	20.6	−17.939
76 Draconis	20.8	[−18.05]
32 Vulpeculæ	20.9	−17.980
ξ Cygni	21.0	−17.966
ζ Cygni	21.2	−17.998
1 H. Draconis, s. p	21.4	[−17.92]
74 Cygni	21.6	−17.966
ι Pegasi	22.1	−17.999
α Lacertæ	22.5	−17.926
10 Lacertæ	22.6	−17.960
η Pegasi	22.7	−17.978
October 22.0, Ws.		
o Cygni	20.2	−17.899
γ Cygni	20.3	−17.883
41 Cygni	20.4	−17.917
α Cygni	20.6	−17.900
76 Draconis	20.8	[−17.86]
32 Vulpeculæ	20.9	−17.951
ξ Cygni	21.0	−17.873
ζ Cygni	21.2	−17.950
1 H. Draconis, s. p	21.4	[−18.08]
74 Cygni	21.6	−17.883
ι Pegasi	22.1	−17.918
October 23.0, Ws.		
o Cygni	20.2	−17.848
γ Cygni	20.3	−17.839
41 Cygni	20.4	−17.877
α Cygni	20.6	−17.823
ε Cygni	20.7	−17.900
32 Vulpeculæ	20.9	−17.907
ξ Cygni	21.0	−17.876
ζ Cygni	21.2	−17.877
1 H. Draconis, s. p	21.4	[−17.59]
74 Cygni	21.6	−17.845
October 26.0, Ws.		
α Cygni	20.6	−17.670
76 Draconis	20.8	[−17.50]
32 Vulpeculæ	20.9	−17.741
ξ Cygni	21.0	−17.732
ζ Cygni	21.2	−17.702
σ Cygni	21.2	−17.683
1 H. Draconis, s. p	21.4	[−17.41]
74 Cygni	21.6	−17.700
π² Cygni	21.7	−17.695
16 Pegasi	21.8	−17.748
ι Pegasi	22.1	−17.717
October 27.2, Ws.		
υ Piscium	1.3	−17.659
ω Andromedæ	1.4	−17.654
α Ursæ Minoris	1.6	[−16.07]
α Trianguli	1.8	−17.640
γ Andromedæ, *pr*	2.0	−17.589
6 Persei	2.1	−17.629
γ Trianguli	2.2	−17.704
θ Persei	2.7	−17.556
41 Arietis	2.8	−17.668
ε Arietis	2.9	−17.651
October 28.0, Ws.		
α Cygni	20.6	−17.595
ε Cygni	20.7	−17.619
32 Vulpeculæ	20.9	−17.685
ξ Cygni	21.0	−17.603
ζ Cygni	21.2	−17.629
σ Cygni	21.2	−17.625
1 H. Draconis, s. p	21.4	[−17.45]
74 Cygni	21.6	−17.603
π² Cygni	21.7	−17.612
ι Pegasi	22.1	−17.642
30 H. Camelop., s. p	22.4	[−17.56]

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
October 29.0, Ws.	h	s
α Cygni	20.6	−17.554
ε Cygni	20.7	−17.599
32 Vulpeculæ	20.9	−17.605
ξ Cygni	21.0	−17.597
ζ Cygni	21.2	−17.601
σ Cygni	21.2	−17.599
1 H. Draconis, s. p	21.4	[−17.53]
74 Cygni	21.6	−17.534
π² Cygni	21.7	−17.556
ι Pegasi	22.1	−17.566
November 1.2, Ws.		
α Ursæ Minoris	1.6	[−16.18]
α Trianguli	1.8	−17.415
γ Andromedæ, *pr*	2.0	−17.396
6 Persei	2.1	−17.407
γ Trianguli	2.2	−17.440
θ Persei	2.7	−17.331
41 Arietis	2.8	−17.442
ε Arietis	2.9	−17.473
Groomb. 2283, s. p	3.0	[−17.35]
ζ Arietis	3.2	−17.422
α Persei	3.3	−17.417
November 2.0, Ws.		
ξ Cygni	21.0	−17.403
ζ Cygni	21.2	−17.396
σ Cygni	21.2	−17.416
1 H. Draconis, s. p	21.4	[−17.20]
74 Cygni	21.6	−17.398
π² Cygni	21.7	−17.352
ι Pegasi	22.1	−17.414
30 H. Camelop., s. p	22.4	[−17.32]
10 Lacertæ	22.6	−17.381
η Pegasi	22.7	−17.378
μ Pegasi	22.8	−17.358
November 3.0, Ws.		
ξ Cygni	21.0	−17.360
ζ Cygni	21.2	−17.380
σ Cygni	21.2	−17.332
November 3.2, Ws.		
α Trianguli	1.8	−17.306
γ Andromedæ, *pr*	2.0	−17.287
6 Persei	2.1	−17.425
γ Trianguli	2.2	−17.359
ν Arietis	2.6	−17.315
θ Persei	2.7	−17.244
41 Arietis	2.8	−17.383
Groomb. 2283, s. p	3.0	[−14.71]
ζ Arietis	3.2	−17.340
α Persei	3.3	−17.294
November 4.0, Ws.		
ξ Cygni	21.0	−17.275
ζ Cygni	21.2	−17.320
σ Cygni	21.2	−17.334
1 H. Draconis, s. p	21.4	[−17.33]
74 Cygni	21.6	−17.268
π² Cygni	21.7	−17.288
ι Pegasi	22.1	−17.349
α Lacertæ	22.5	−17.270
10 Lacertæ	22.6	−17.328
η Pegasi	22.7	−17.290
November 5.0, Ws.		
ξ Cygni	21.0	−17.269
ζ Cygni	21.2	−17.283
σ Cygni	21.2	−17.290
1 H. Draconis, s. p	21.4	[−17.22]
74 Cygni	21.6	−17.255
π² Cygni	21.7	−17.238
ι Pegasi	22.1	−17.296
November 6.0, Ws.		
σ Cygni	21.4	−17.168
74 Cygni	21.6	−17.174
π² Cygni	21.7	−17.196
16 Pegasi	21.8	−17.238
ι Pegasi	22.1	−17.234
30 H. Camelop., s. p	22.4	[−17.38]
α Lacertæ	22.5	−17.191
10 Lacertæ	22.6	−17.206
η Pegasi	22.7	−17.186
μ Pegasi	22.8	−17.222
τ Pegasi	23.3	−17.217
39 H. Cephei	23.5	[−16.45]

TABLE XIV.—*Observations for Clock Corrections at Washington*—Continued

[Not corrected for personal equation]

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
November 7.0, Ws.	h	s
g Cygni	21.4	−17.153
74 Cygni	21.6	−17.145
π² Cygni	21.7	−17.150
16 Pegasi	21.8	−17.239
ι Pegasi	22.1	−17.217
30 H. Camelop., s. p	22.4	[−16.88]
α Lacertæ	22.5	−17.160
10 Lacertæ	22.6	−17.177
μ Pegasi	22.8	−17.150
τ Pegasi	23.3	−17.205
39 H. Cephei	23.5	[−16.76]
November 8.0, Ws.		
ι Pegasi	22.1	−17.132
30 H. Camelop., s. p	22.4	[−16.97]
α Lacertæ	22.5	−17.124
10 Lacertæ	22.6	−17.115
η Pegasi	22.7	−17.144
μ Pegasi	22.8	−17.092
ο Andromedæ	23.0	−17.126
τ Pegasi	23.3	−17.136
39 H. Cephei	23.5	[−16.76]
ι Andromedæ	23.6	−17.127
ψ Andromedæ	23.7	−17.138
November 11.2, Ws.		
ε Arietis *m*	2.9	−16.978
Groomb. 2283, s. p	3.0	[−18.25]
α Persei	3.3	−16.993
δ Persei	3.6	−16.970
η Tauri	3.7	−17.027
ε Persei	3.9	−16.978
A Tauri	4.0	−17.021
c Persei	4.1	−16.950
Groomb. 750	4.2	[−17.17]
m Persei	4.5	−16.925
τ Tauri	4.6	−16.966
November 12.0, Ws.		
²74 Cygni	21.6	−16.937
π² Cygni	21.7	−16.919
16 Pegasi	21.8	−16.965
ι Pegasi	22.1	−16.988
30 H. Camelop., s. p	22.4	[−17.19]
α Lacertæ	22.5	−16.927
10 Lacertæ	22.6	−16.990
η Pegasi	22.7	−16.973
μ Pegasi	22.8	−16.956
ο Andromedæ	23.0	−16.939
τ Pegasi	23.3	−16.974
39 H. Cephei	23.5	[−15.99]
November 13.0, Ws.		
74 Cygni	21.6	−16.882
π² Cygni	21.7	−16.894
16 Pegasi	21.8	−16.976
ι Pegasi	22.1	−16.950
30 H. Camelop., s. p	22.4	[−17.05]
α Lacertæ	22.5	−16.884
10 Lacertæ	22.6	−16.909
μ Pegasi	22.8	−16.933
ο Andromedæ	23.0	−16.897
τ Pegasi	23.3	−16.902
39 H. Cephei	23.5	[−16.12]
November 15.0, Ws.		
74 Cygni	21.6	−16.793
π² Cygni	21.7	−16.750
16 Pegasi	21.8	−16.833

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
November 15.0, Ws.—Contd.	h	s
ι Pegasi	22.1	−16.821
30 H. Camelop., s. p	22.4	[−17.00]
α Lacertæ	22.5	−16.792
10 Lacertæ	22.6	−16.813
η Pegasi	22.7	−16.830
μ Pegasi	22.8	−16.834
ο Andromedæ	23.0	−16.774
November 17.3, Ws.		
ν Aurigæ	5.8	−16.701
δ Ursæ Minoris, s. p	5.9	[−15.62]
η Geminorum	6.2	−16.697
ψ Aurigæ	6.3	−16.676
θ Geminorum	6.8	−16.742
ζ Geminorum	7.0	−16.714
63 Aurigæ	7.1	−16.720
25 H. Camelop	7.3	[−16.90]
ο Geminorum	7.4	−16.738
υ Geminorum	7.5	−16.730
β Geminorum	7.7	−16.751
26 Lyncis	7.8	−16.652
November 18.0, Ws.		
16 Pegasi	21.8	−16.683
ι Pegasi	22.1	−16.722
30 H. Camelop., s. p	22.4	[−16.19]
10 Lacertæ	22.6	−16.643
η Pegasi	22.7	−16.626
μ Pegasi	22.8	−16.677
τ Pegasi	23.3	−16.676
39 H. Cephei	23.5	[−16.66]
ι Andromedæ	23.6	−16.690
ψ Andromedæ	23.7	−16.683
22 Andromedæ	0.1	−16.709
November 19.2, Ws.		
δ Persei	3.6	−16.625
η Tauri	3.7	−16.656
ζ Persei	3.8	−16.691
ε Persei	3.9	−16.641
Groomb. 750	4.2	[−17.26]
m Persei	4.5	−16.607
τ Tauri	4.6	−16.631
ε Ursæ Minoris, s. p	4.9	[−16.31]
η Aurigæ	5.0	−16.634
α Aurigæ	5.2	−16.636
β Tauri	5.4	−16.656
November 20.0, Ws.		
μ Pegasi	22.8	−16.629
ο Andromedæ	23.0	−16.557
τ Pegasi	23.3	−16.622
39 H. Cephei	23.5	[−16.50]
ι Andromedæ	23.6	−16.579
ψ Andromedæ	23.7	−16.636
ψ Pegasi	23.9	−16.607
22 Andromedæ	0.1	−16.615
σ Andromedæ	0.2	−16.605
δ Andromedæ	0.6	−16.685
November 23.0, Ws.		
η Pegasi	22.7	−16.451
μ Pegasi	22.8	−16.475
ο Andromedæ	23.0	−16.471
τ Pegasi	23.3	−16.495
39 H. Cephei	23.5	[−16.54]
ι Andromedæ	23.6	−16.484

Greenwich Date, Observer, Star	Approx. R. A.	Observed Clock Correction
1926		
November 23.0, Ws.—Contd.	h	s
ψ Andromedæ	23.7	−16.446
ψ Pegasi	23.9	−16.476
22 Andromedæ	0.1	−16.493
σ Andromedæ	0.2	−16.478
November 24.0, Ws.		
α Lacertæ	22.5	−16.372
η Pegasi	22.7	−16.436
μ Pegasi	22.8	−16.427
ο Andromedæ	23.0	−16.411
τ Pegasi	23.3	−16.427
39 H. Cephei	23.5	[−16.77]
ι Andromedæ	23.6	−16.402
ψ Andromedæ	23.7	−16.476
ψ Pegasi	23.9	−16.437
22 Andromedæ	0.1	−16.424
Bradley 1672, s. p	0.2	[−15.93]
November 25.0, Ws.		
α Lacertæ	22.5	−16.332
η Pegasi	22.7	−16.389
μ Pegasi	22.8	−16.381
ο Andromedæ	23.0	−16.370
τ Pegasi	23.3	−16.392
39 H. Cephei	23.5	[−15.99]
ι Andromedæ	23.6	−16.358
ψ Andromedæ	23.7	−16.400
ψ Pegasi	23.9	−16.433
α Andromedæ	0.1	−16.412
November 28.0, Ws.		
η Pegasi	22.7	−16.302
μ Pegasi	22.8	−16.318
ο Andromedæ	23.0	−16.350
τ Pegasi	23.3	−16.358
39 H. Cephei	23.5	[−16.15]
ι Andromedæ	23.6	−16.286
ψ Andromedæ	23.7	−16.259
ψ Pegasi	23.9	−16.297
22 Andromedæ	0.1	−16.336
Bradley 1672, s. p	0.2	[−15.74]
ο Cassiopeiæ	0.7	−16.258
November 29.1, Ws.		
ο Andromedæ	23.0	−16.274
τ Pegasi	23.3	−16.293
39 H. Cephei	23.5	[−15.78]
ι Andromedæ	23.6	−16.243
ψ Andromedæ	23.7	−16.281
ψ Pegasi	23.9	−16.261
α Andromedæ	0.1	−16.321
σ Andromedæ	0.2	−16.310
π Andromedæ	0.5	−16.275
ο Cassiopeiæ	0.7	−16.294
ν Andromedæ	0.8	−16.269
December 1.1, Ws.		
σ Andromedæ	0.2	−16.194
π Andromedæ	0.5	−16.227
ο Cassiopeiæ	0.7	−16.200
32² H. Camelop., s. p	0.8	[−15.96]
43 H. Cephei	1.0	[−15.85]
β Andromedæ	1.1	−16.220
υ Piscium	1.2	−16.170
ω Andromedæ	1.4	−16.197
υ Andromedæ	1.5	−16.121
φ Persei	1.7	−16.094
α Trianguli	1.8	−16.195

TABLE XV.—*Corrections to Riefler Sidereal Clock at San Diego*

[Corrected for personal equation]

Greenwich Date	Obsr.	No. Stars	Sid. Hour	Clock Correction	Wind Direction	Wind Intensity	Greenwich Date	Obsr.	No. Stars	Sid. Hour	Clock Correction	Wind Direction	Wind Intensity
1926			h	s			1926			h	s		
Oct. 2. 1	Hd.	4	20. 38	−32. 157	--	---	Nov. 9. 1	L.	13	22. 09	−39. 281		0
3. 1	L.	4	19. 18	−33. 825 [1]	--	0	9. 4	L.	8	5. 39	−39. 267	W.	2–0
4. 1	Hd.	9	19. 39	−35. 458 [1]	--	0	10. 1	Hd.	11	21. 80	−43. 278 [2]	E.	2–0
5. 2	L.	10	20. 71	−35. 144	--	0	10. 4	Hd.	10	4. 43	−43. 266	--	0
6. 2	Hd.	16	21. 04	−38. 826 [2]	--	---	11. 2	L.	10	0. 60	−43. 228	S.	2–0
6. 4	Hd.	6	1. 82	−38. 765	--	---	11. 4	L.	10	4. 69	−43. 225	S.	1
7. 2	L.	14	21. 26	−38. 537	--	0	12. 1	Hd.	9	22. 19	−43. 215	--	0
7. 4	L.	11	3. 19	−38. 442	--	0	13. 4	L.	10	4. 80	−55. 151 [6]	W.	3–1
8. 2	Hd.	13	21. 94	−38. 222	S.	2–0	14. 1	Hd.	11	22. 26	−55. 124	NW.	1–0
10. 2	Hd.	12	21. 08	−37. 650	W.	2–0	14. 4	Hd.	11	4. 67	−57. 102 [1]	--	0
11. 1	L.	8	20. 45	−37. 396	NW.	4–0	15. 1	L.	10	22. 80	−61. 087 [2]	NW.	3–0
12. 1	Hd.	8	20. 04	−37. 180	W.	3	15. 4	L.	10	4. 93	−61. 081	--	0
13. 1	L.	4	20. 32	−36. 911	--	0	16. 1	Hd.	12	22. 45	−61. 037	NW.	3–1
14. 1	Hd.	6	20. 22	−36. 678	--	0					−65. 037 [2]	--	---
15. 2	L.	14	21. 54	−36. 420	NW.	2–1	16. 4	Hd.	12	4. 83	−71. 040 [3]	--	0
16. 1	Hd.	11	20. 75	−36. 169	W.	3–0					−73. 040 [1]	--	---
17. 1	L.	5	20. 18	−35. 984	--	0	17. 1	L.	11	23. 16	−73. 039	--	0
18. 1	Hd.	10	20. 33	−37. 833 [1]	W.	3–1	17. 4	L.	10	5. 58	−73. 022	--	0
19. 1	L.	5	20. 22	−37. 600	S.	2	18. 1	Hd.	11	22. 95	−72. 969	W.	1–0
20. 1	Hd.	10	20. 34	−37. 457	--	0	18. 4	Hd.	11	4. 79	−72. 955	S.	2–1
21. 1	Hd.	7	20. 24	−37. 233	W.	3–2	19. 1	L.	10	22. 65	−72. 966	--	0
21. 3	Hd.	10	2. 59	−37. 208	W.	1	19. 4	L.	10	4. 99	−72. 933	S.	1–0
22. 1	L.	10	21. 08	−37. 067	NW.	1	20. 2	Hd.	10	23. 71	−72. 934	S.	1–0
22. 4	L.	6	3. 03	−37. 016	NW.	1	20. 4	Hd.	11	5. 21	−72. 914	--	0
26. 1	L.	7	20. 54	−36. 565	NW.	3–1	21. 1	L.	10	22. 76	−72. 919	--	0
27. 1	Hd.	7	20. 24	−40. 410 [2]	--	0	21. 4	L.	10	5. 54	−72. 924	SE.	1
28. 1	L.	10	20. 54	−40. 278	W.	1–0					−74. 924 [1]	--	---
29. 1	Hd.	9	20. 56	−40. 163	--	---	22. 1	Hd.	10	22. 36	−74. 899	NW.	2–0
30. 1	L.	9	20. 71	−40. 087	--	0	22. 3	Hd.	11	4. 57	−74. 886	--	0
30. 4	L.	9	3. 71	−40. 044	--	0	24. 1	Hd.	9	22. 50	−78. 844 [2]	SW.	1
31. 1	Hd.	9	21. 10	−39. 967	--	0	25. 2	L.	10	2. 01	−88. 820 [4]	--	0
31. 4	Hd.	11	3. 72	−39. 983	NW.	1	26. 1	Hd.	9	22. 67	−88. 810	W.	2–1
Nov. 1. 1	L.	9	21. 72	−39. 880	NW.	1–0	26. 4	Hd.	9	5. 22	−88. 750	--	0
1. 4	L.	10	4. 51	−39. 857	--	---	28. 1	Hd.	10	22. 80	−38. 813 [5]	W.	3–2
2. 1	Hd.	9	21. 54	−39. 794	--	0	28. 4	Hd.	11	5. 32	−40. 750 [1]	S.	1–0
2. 4	Hd.	9	3. 72	−39. 764	--	0	29. 1	L.	10	23. 44	−56. 741 [7]	NW.	4–0
3. 1	L.	9	21. 91	−39. 740	S.	2–0	29. 3	L.	9	4. 21	−56. 721	--	0
3. 4	L.	10	4. 41	−39. 704	S.	1–0	30. 1	Hd.	8	22. 78	−56. 692	W.	3–0
5. 1	L.	9	21. 90	−39. 591	N.	1–0	30. 3	Hd.	3	4. 83	−56. 679	--	---
6. 1	Hd.	7	21. 50	−39. 489	--	0	Dec. 1. 1	L.	10	23. 31	−56. 645	--	0
7. 1	L.	8	21. 35	−39. 446	NW.	3–0	1. 3	L.	7	4. 71	−56. 590	E.	1–0
8. 1	Hd.	7	21. 06	−39. 263	--	0							

[1] Clock jumped 2s.
[2] Clock jumped 4s.
[3] Clock jumped 6s.
[4] Clock jumped 10s.
[5] Clock jumped 10s, changed 1 minute.
[6] Clock jumped 12s.
[7] Clock jumped 16s.

The intensity of the wind was estimated by the observers on a scale of 10.

TABLE XVI.—*Corrections to Riefler Sidereal Clock at Washington*

[Corrected for personal equation and reduction to standard meridian of Naval Observatory]

Greenwich Date	Obsr.	No. Stars	Sid. Hour	Clock Correction	Wind: Direction	Wind: Intensity	Greenwich Date	Obsr.	No. Stars	Sid. Hour	Clock Correction	Wind: Direction	Wind: Intensity
1926			h	s			1926			h	s		
Oct. 3. 1	Ws.	9	21. 10	−18. 931	NW.	1	Nov. 2. 0	Ws.	9	21. 88	−17. 452	W.	1
4. 2	Ws.	9	0. 74	−18. 864	--	0	3. 0	Ws.	3	21. 13	−17. 421	NW.	3
5. 2	Ws.	9	1. 57	−18. 811	SE.	2–1	3. 2	Ws.	9	2. 52	−17. 392	NW.	2–1
6. 0	Ws.	9	20. 13	−18. 789	SE.	4–3	4. 0	Ws.	9	21. 84	−17. 366	NW.	2–1
7. 2	Ws.	9	0. 93	−18. 752	SW.	2–1	5. 0	Ws.	6	21. 47	−17. 336	W.	1–0
8. 2	Ws.	9	1. 31	−18. 721	SW.	1	6. 0	Ws.	10	22. 25	−17. 267	NW.	2–1
9. 0	Ws.	9	20. 47	−18. 689	SW.	2–1	7. 0	Ws.	9	22. 20	−17. 241	SW.	2–1
10. 0	Ws.	9	20. 33	−18. 625	SW.	1–0	8. 0	Ws.	9	22. 92	−17. 190	E.	2–1
11. 2	Ws.	8	1. 41	−18. 558	W.	1	11. 2	Ws.	9	3. 84	−17. 044	NW.	4–2
15. 0	Ws.	9	20. 84	−18. 329	NW.	1	12. 0	Ws.	10	22. 41	−17. 021	W.	1
16. 0	Ws.	10	20. 97	−18. 286	E.	2–1	13. 0	Ws.	9	22. 38	−16. 978	SW.	1
18. 0	Ws.	8	20. 94	−18. 158	NW.	3–2	15. 0	Ws.	9	22. 31	−16. 868	SE.	3–2
19. 0	Ws.	9	21. 61	−18. 124	W.	3–1	17. 4	Ws.	10	6. 96	−16. 776	SW.	1–0
20. 0	Ws.	9	21. 09	−18. 076	NW.	2–1	18. 0	Ws.	9	22. 97	−16. 743	SE.	1
21. 0	Ws.	9	21. 69	−18. 032	NW.	3–0	19. 2	Ws.	9	4. 41	−16. 706	NW.	4–3
22. 0	Ws.	9	20. 92	−17. 972	NW.	1	20. 0	Ws.	9	23. 69	−16. 679	NW.	2–1
23. 0	Ws.	9	20. 77	−17. 930	SW.	1	23. 0	Ws.	9	23. 48	−16. 538	S.	1
26. 0	Ws.	9	21. 34	−17. 774	SW.	4–1	24. 0	Ws.	9	23. 29	−16. 488	SW.	2–0
27. 2	Ws.	9	2. 13	−17. 703	W.	2–1	25. 0	Ws.	9	23. 29	−16. 449	W.	6–2
28. 0	Ws.	9	21. 22	−17. 688	W.	1	28. 0	Ws.	9	23. 53	−16. 371	NW.	8–3
29. 0	Ws.	9	21. 22	−17. 643	W.	1–0	29. 0	Ws.	10	23. 98	−16. 346	SE.	2–1
Nov. 1. 2	Ws.	9	2. 56	−17. 480	NW.	4	Dec. 1. 1	Ws.	9	1. 12	−16. 244	NW.	1

The intensity of the wind was estimated by the observer on a scale of 10. It was found from a comparison with the records of the United States Weather Bureau that an estimate of 3 corresponds to a velocity of about 9 miles per hour; 6, to a velocity of 18 miles per hour, etc.

TABLE XVII.—*Reception of Radio Longitude Signals at San Diego*

CHAPULTEPEC, XDA, TIME SIGNALS, $0^h\ 55^m$ TO $1^h\ 0^m$ G. C. T., REGISTRATION

[The times given are for the beginnings of the signals]

Greenwich Date	Seconds of Clock: 1st Signal	Seconds of Clock: 301st Signal	Clock Correction	San Diego Sidereal Times: 1st Signal	San Diego Sidereal Times: 301st Signal	Greenwich Date	Seconds of Clock: 1st Signal	Seconds of Clock: 301st Signal	Clock Correction	San Diego Sidereal Times: 1st Signal	San Diego Sidereal Times: 301st Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Nov. 16	35. 653	36. 443	−61. 040	20 43 34. 613*	48 35. 403*	Nov. 25	32. 440	33. 261	−88. 824	21 19 3. 616	24 4. 437
17	44. 143	44. 964	−73. 040	20 47 31. 103	52 31. 924	27	31. 388	32. 317	−34. 781	21 26 56. 607*	31 57. 536*
18	40. 640	41. 461	−72. 974	20 51 27. 666	56 28. 487	28	32. 086	32. 907	−38. 814	21 30 53. 272	35 54. 093
20	33. 715	34. 536	−72. 937	20 59 20. 778	4 21. 599	Dec. 1	39. 651	40. 472	−56. 650	21 42 43. 001	47 43. 822
23	25. 405	26. 226	−74. 872	21 11 10. 533	16 11. 354						

TABLE XVII.—*Reception of Radio Longitude Signals at San Diego*—Continued

NO. 1, ANNAPOLIS, NSS, TIME SIGNALS, 2^h 55^m TO 3^h 0^m G. C. T., REGISTRATION

[The times given are for the beginnings of the signals]

Greenwich Date	Seconds of Clock: 1st Signal	Seconds of Clock: 301st Signal	Clock Correction	San Diego Sidereal Times: 1st Signal	San Diego Sidereal Times: 301st Signal	Greenwich Date	Seconds of Clock: 1st Signal	Seconds of Clock: 301st Signal	Clock Correction	San Diego Sidereal Times: 1st Signal	San Diego Sidereal Times: 301st Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 2	1.561	2.382	−32.166	19 46 29.395	51 30.216	Nov. 1	25.793	26.614	−39.880	21 44 45.913	49 46.734
3	59.796	0.617	−33.814	19 50 25.982	55 26.803	2	22.301	23.122	−39.793	21 48 42.508	53 43.329
4	57.923	58.744	−35.451	19 54 22.472	59 23.293	3	18.747	19.568	−39.740	21 52 39.007	57 39.828
6	54.361	55.182	−38.839	20 2 15.522	7 16.343	4	15.255	16.076	−39.662	21 56 35.593	1 36.414
8	46.883	47.704	−38.245	20 10 8.638	15 9.459	5	11.747	12.568	−39.590	22 0 32.157	5 32.978
9	43.198	44.019	−37.952	20 14 5.246	19 6.067	6	8.191	9.012	−39.487	22 4 28.704	9 29.525
10	39.462	40.283	−37.659	20 18 1.803	23 2.624	7	4.668	5.489	−39.440	22 8 25.228	13 26.049
11	35.763	36.584	−37.395	20 21 58.368	26 59.189	8	1.121	1.942	−39.263	22 12 21.858	17 22.679
12	32.090	32.911	−37.175	20 25 54.915	30 55.736	9	57.690	58.511	−39.280	22 16 18.410	21 19.231
13	28.383	29.225	−36.910	20 29 51.473*	34 52.315*	10	58.217	59.038	−43.278	22 20 14.939	25 15.760
14	24.689	25.510	−36.674	20 33 48.015	38 48.836	11	54.724	55.545	−43.231	22 24 11.493	29 12.314
15	20.983	21.804	−36.430	20 37 44.553	42 45.374	12	51.205	52.026	−43.215	22 28 7.990	33 8.811
16	17.270	18.091	−36.170	20 41 41.100	46 41.921	13	53.660	54.481	−49.164	22 32 4.496	37 5.317
17	13.650	14.471	−35.981	20 45 37.669	50 38.490	14	56.271	57.092	−55.124	22 36 1.147	41 1.968
18	12.021	12.842	−37.829	20 49 34.192	54 35.013	15	58.822	59.643	−61.086	22 39 57.736	44 58.557
19	8.395	9.216	−37.596	20 53 30.799	58 31.620	16	55.310	56.131	−61.035	22 43 54.275	48 55.096
20	4.711	5.532	−37.451	20 57 27.260	2 28.081	17	3.815	4.636	−73.039	22 47 50.776	52 51.597
21	1.115	1.936	−37.226	21 1 23.889	6 24.710	18	0.324	1.145	−72.966	22 51 47.358	56 48.179
22	57.486	58.307	−37.068	21 5 20.418	10 21.239	19	56.866	57.687	−72.966	22 55 43.900	0 44.721
23	53.991	54.812	−36.933	21 9 17.058	14 17.879	21	49.983	50.804	−72.918	23 3 37.065	8 37.886
24	50.379	51.200	−36.809	21 13 13.570	18 14.391	22	48.527	49.348	−74.898	23 7 33.629	12 34.450
25	46.706	47.527	−36.685	21 17 10.021	22 10.842	23	45.067	45.888	−74.870	23 11 30.197	16 31.018
26	43.209	44.030	−36.560	21 21 6.649	26 7.470	24	45.591	46.412	−78.844	23 15 26.747	20 27.568
27	43.621	44.442	−40.405	21 25 3.216	30 4.037	25	52.131	52.952	−88.823	23 19 23.308	24 24.129
28	40.004	40.825	−40.273	21 28 59.731	34 0.552	26	48.625	49.446	−88.808	23 23 19.817	28 20.638
29	36.469	37.290	−40.159	21 32 56.310	37 57.131	27	51.152	51.973	−34.782	23 27 16.370	32 17.191
30	32.908	33.729	−40.084	21 36 52.824	41 53.645	28	51.666	52.487	−38.814	23 31 12.852	36 13.673
31	29.351	30.172	−39.966	21 40 49.385	45 50.206	29	6.256	7.077	−56.742	23 35 9.514	40 10.335
						30	2.784	3.605	−56.690	23 39 6.094	44 6.915
						Dec. 1	59.307	0.128	−56.644	23 43 2.663	48 3.484

NO. 2, ANNAPOLIS, NSS, RHYTHMIC SIGNALS, 3^h 10^m TO 3^h 15^m, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock: 1st Signal	Seconds of Clock: 306th Signal	Clock Correction	San Diego Sidereal Times: 1st Signal	San Diego Sidereal Times: 306th Signal	Greenwich Date	Seconds of Clock: 1st Signal	Seconds of Clock: 306th Signal	Clock Correction	San Diego Sidereal Times: 1st Signal	San Diego Sidereal Times: 306th Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 2	4.036	4.857	−32.163	20 1 31.873	6 32.694	Nov. 1	28.301	29.122	−39.879	21 59 48.422	4 49.243
3	2.224	3.045	−33.811	20 5 28.413	10 29.234	2	24.722	25.543	−39.791	22 3 44.931	8 45.752
4	0.354	1.175	−35.447	20 9 24.907	14 25.728	3	21.227	22.048	−39.740	22 7 41.487	12 42.308
5	56.627	57.448	−35.149	20 13 21.478	18 22.299	4	17.710	18.531	−39.661	22 11 38.049	16 38.870
6	56.740	57.561	−38.836	20 17 17.904	22 18.725	5	14.185	15.006	−39.589	22 15 34.596	20 35.417
7	53.078	53.899	−38.548	20 21 14.530	26 15.351	6	10.719	11.540	−39.487	22 19 31.232	24 32.053
8	49.316	50.137	−38.242	20 25 11.074	29 11.895	7	7.053	7.874	−39.438	22 23 27.615	28 28.436
9	45.560	46.381	−37.948	20 29 7.612	34 8.433	8	3.680	4.501	−39.263	22 27 24.417	32 25.238
10	41.798	42.619	−37.656	20 33 4.142	38 4.963	9	0.122	0.943	−39.280	22 31 20.842	36 21.663
11	38.210	39.031	−37.394	20 37 0.816	42 1.637	10	0.703	1.524	−43.278	22 35 17.425	40 18.246
12	34.568	35.389	−37.172	20 40 57.396	45 58.217	11	57.178	57.999	−43.231	22 39 13.947	44 14.768
13	30.895	31.716	−36.907	20 44 53.988	49 54.809	12	53.696	54.517	−43.215	22 43 10.481	48 11.302
14	27.147	27.968	−36.672	20 48 50.475	53 51.296	13	56.546	57.367	−49.164	22 47 7.382	52 8.203
15	23.474	24.295	−36.427	20 52 47.047	57 47.868	14	58.757	59.578	−55.124	22 51 3.633	56 4.454
16	19.695	20.516	−36.167	20 56 43.528	1 44.349	15	1.300	2.121	−61.086	22 55 0.214	0 1.035
17	16.139	16.960	−35.979	21 0 40.160	5 40.981	16	1.785	2.606	−65.035	22 58 56.750	3 57.571
18	14.495	15.316	−37.826	21 4 36.669	9 37.490	17	6.308	7.129	−73.039	23 2 53.269	7 54.090
19	10.820	11.641	−37.594	21 8 33.226	13 34.047	18	2.790	3.611	−72.966	23 6 49.824	11 50.645
20	7.144	7.965	−37.448	21 12 29.696	17 30.517	19	59.328	0.170	−72.966	23 10 46.362*	15 47.204*
21	3.544	4.365	−37.225	21 16 26.319	21 27.140	21	52.417	53.238	−72.918	23 18 39.499	23 40.320
22	59.959	0.780	−37.066	21 20 22.893	25 23.714	22	50.956	51.777	−74.898	23 22 36.058	27 36.879
23	56.373	57.194	−36.932	21 24 19.441	29 20.262	23	47.546	48.367	−74.870	23 26 32.676	31 33.497
24	52.846	53.667	−36.807	21 28 16.039	33 16.860	24	48.043	48.864	−78.844	23 30 29.199	35 30.020
25	49.284	50.105	−36.684	21 32 12.600	37 13.421	25	54.563	55.384	−88.823	23 34 25.740	39 26.561
26	45.675	46.496	−36.559	21 36 9.116	41 9.937	26	51.154	51.975	−88.808	23 38 22.346	43 23.167
27	46.058	46.879	−40.403	21 40 5.655	45 6.476	27	53.614	54.435	−34.782	23 42 18.832	47 19.653
28	42.409	43.230	−40.271	21 44 2.138	49 2.959	28	54.201	55.022	−38.814	23 46 15.387	51 16.208
29	38.935	39.756	−40.158	21 47 58.777	52 59.598	29	8.709	9.530	−56.742	23 50 11.967	55 12.788
30	35.413	36.234	−40.083	21 51 55.330	56 56.151	30	5.283	6.104	−56.690	23 54 8.593	59 9.414
31	31.833	32.654	−39.965	21 55 51.868	0 52.689	Dec. 1	1.787	2.608	−56.644	23 58 5.143	3 5.964

NO. 2, ANNAPOLIS, NSS, RHYTHMIC SIGNALS, 3^h 10^m TO 3^h 15^m, G. C. T., EAR

Oct. 3	2.21	3.03	−33.81	20 5 28.40	10 29.22 M	Oct. 15	23.45	24.27	−36.43	20 52 47.02	57 47.84 M
5	56.55	57.37	−35.15	20 13 21.40	18 22.22 M	17	16.06	16.88	−35.98	21 0 40.08	5 40.90 M
7	53.09	53.91	−38.55	20 21 14.54	26 15.36 M	19	10.81	11.63	−37.59	21 8 33.22	13 34.04 M
9	45.52	46.34	−37.95	20 29 7.57	34 8.39 M	21	3.50	4.32	−37.22	21 16 26.28	21 27.10 M
11	38.18	39.00	−37.39	20 37 0.79	42 1.61 M	23	56.36	57.18	−36.93	21 24 19.43	29 20.25 M
13	30.86	31.68	−36.91	20 44 53.95	49 54.77 M	25	49.26	50.08	−36.68	21 32 12.58	37 13.40 M

TABLE XVII.—*Reception of Radio Longitude Signals at San Diego*—Continued

NO. 4, BELLEVUE, NKF, 75 METERS, RHYTHMIC SIGNALS, 3^h 20^m TO 3^h 25^m, G. C. T., REGISTRATION

[The times given are for the beginnings of the signals]

Greenwich Date	Seconds of Clock		Clock Correction	San Diego Sidereal Times		Greenwich Date	Seconds of Clock		Clock Correction	San Diego Sidereal Times	
	1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 3	3.837	4.658	−33.809	20 15 30.028	20 30.849	Nov. 6	12.355	13.176	−39.487	22 29 32.868	34 33.689
4	1.958	2.779	−35.445	20 19 26.513	24 27.334	7	8.672	9.493	−39.437	22 33 29.235	38 30.056
6	58.351	59.172	−38.834	20 27 19.517	32 20.338	8	5.293	6.114	−39.263	22 37 26.030	42 26.851
7	54.698	55.519	−38.546	20 31 16.152	36 16.973	9	1.744	2.565	−39.280	22 41 22.464	46 23.285
8	50.922	51.743	−38.240	20 35 12.682	40 13.503	11	58.778	59.622	−43.231	22 49 15.547*	54 16.391*
9	47.157	47.978	−37.946	20 39 9.211	44 10.032	12	55.277	56.098	−43.215	22 53 12.062	58 12.883
12	36.179	37.000	−37.170	20 50 59.009	55 59.830	14	0.346	1.167	−55.124	23 1 5.222	6 6.043
14	28.772	29.593	−36.670	20 58 52.102	3 52.923	15	2.913	3.755	−61.086	23 5 1.827*	10 2.669*
15	25.097	25.918	−36.425	21 2 48.672	7 49.493	16	3.425	4.246	−65.035	23 8 58.390	13 59.211
17	17.738	18.559	−35.978	21 10 41.760	15 42.581	17	7.949	8.770	−73.039	23 12 54.910	17 55.731
19	12.443	13.264	−37.593	21 18 34.850	23 35.671	18	4.416	5.237	−72.966	23 16 51.450	21 52.271
21	5.151	5.972	−37.223	21 26 27.928	31 28.749	19	0.954	1.775	−72.966	23 20 47.988	25 48.809
22	1.549	2.370	−37.064	21 30 24.485	35 25.306	20	57.457	58.278	−72.935	23 24 44.522	29 45.343
23	57.984	58.805	−36.930	21 34 21.054	39 21.875	21	54.037	54.858	−72.918	23 28 41.119	33 41.940
24	54.467	55.288	−36.806	21 38 17.661	43 18.482	22	52.585	53.406	−74.898	23 32 37.687	37 38.508
25	50.910	51.731	−36.683	21 42 14.227	47 15.048	24	49.662	50.483	−78.844	23 40 30.818	45 31.639
28	44.033	44.854	−40.270	21 54 3.763	59 4.584	25	56.185	57.006	−88.823	23 44 27.362	49 28.183
29	40.548	41.369	−40.157	21 58 0.391	3 1.212	26	52.774	53.595	−88.808	23 48 23.966	53 24.787
31	33.471	34.292	−39.965	22 5 53.506	10 54.327	27	55.233	56.054	−34.782	23 52 20.451	57 21.272
Nov. 1	29.923	30.744	−39.879	22 9 50.044	14 50.865	28	55.790	56.611	−38.814	23 56 16.976	1 17.797
3	22.856	23.677	−39.740	22 17 43.116	22 43.937	29	10.339	11.160	−56.742	0 0 13.597	5 14.418
4	19.347	20.168	−39.660	22 21 39.687	26 40.508	30	6.923	7.744	−56.690	0 4 10.233	9 11.054
5	15.800	16.621	−39.589	22 25 36.211	30 37.032	Dec. 1	3.393	4.243	−56.644	0 8 6.749*	13 7.599*

NO. 4, BELLEVUE, NKF, 75 METERS, RHYTHMIC SIGNALS, 3^h 20^m TO 3^h 25^m, G. C. T., EAR

Oct. 11	39.83	40.65	−37.39	20 47 2.44	52 3.26 M	Oct. 27	47.59	48.41	−40.40	21 50 7.19	55 8.01 M
13	32.49	33.31	−36.91	20 54 55.58	59 56.40 M	Nov. 2	26.17	26.99	−39.79	22 13 46.38	18 47.20 M

NO. 5, HONOLULU, NPM, RHYTHMIC SIGNALS, 3^h 30^m TO 3^h 35^m, G. C. T., REGISTRATION

Oct. 2	28.435	29.271	−32.158	20 21 56.277*	26 57.113*	Nov. 1	47.922	48.730	−39.878	22 20 8.044	25 8.852
3	22.300	23.105	−33.805	20 25 48.495	29 49.300	2	40.683	41.491	−39.790	22 24 0.893	29 1.701
4	16.197	17.002	−35.444	20 29 40.753	34 41.558	3	33.462	34.270	−39.739	22 27 53.723	32 54.531
5	7.982	8.787	−35.146	20 33 32.836	38 33.641	4	26.371	27.200	−39.660	22 31 46.711*	36 47.540*
6	3.820	4.625	−38.832	20 37 24.988	42 25.793	5	18.539	19.347	−39.588	22 36 38.951	41 39.759
7	54.838	55.643	−38.544	20 42 16.294	47 17.099	6	11.612	12.420	−39.486	22 40 32.126	45 32.934
8	46.687	47.492	−38.237	20 46 8.450	51 9.255	7	5.185	5.994	−39.435	22 43 25.750	48 26.559
9	38.679	39.485	−37.944	20 50 0.735	55 1.541	8	57.976	58.785	−39.263	22 47 18.713	52 19.522
10	30.681	31.487	−37.653	20 53 53.028	58 53.834	9	49.779	50.588	−39.281	22 52 10.498	56 11.307
11	22.771	23.577	−37.390	20 57 45.381	2 46.187	10	46.544	47.353	−43.278	22 56 3.266	1 4.075
12	14.785	15.591	−37.168	21 1 37.617	6 38.423	11	39.409	40.218	−43.231	22 59 56.178	4 56.987
13	6.753	7.559	−36.904	21 5 29.849	10 30.655	12	32.120	32.951	−43.215	23 3 48.905*	8 49.736*
14	58.887	59.693	−36.668	21 9 22.219	14 23.025	14	29.557	30.366	−55.124	23 11 34.433	16 35.242
15	51.110	51.916	−36.423	21 13 14.687	18 15.493	15	29.274	30.083	−61.086	23 14 28.188	19 28.997
16	43.222	44.029	−36.165	21 17 7.057	22 7.864	16	25.460	26.269	−65.035	23 19 20.425	24 21.234
17	35.575	36.382	−35.977	21 20 59.598	26 0.405	17	26.642	27.451	−73.039	23 23 13.603	28 14.412
18	29.867	30.674	−37.823	21 24 52.044	29 52.851	18	19.698	20.507	−72.966	23 27 6.732	32 7.541
19	22.071	22.878	−37.592	21 28 44.479	33 45.286	19	12.784	13.593	−72.966	23 30 59.818	36 0.627
20	14.441	15.248	−37.446	21 32 36.995	37 37.802	20	5.887	6.696	−72.935	23 34 52.952	39 53.761
21	6.830	7.637	−37.221	21 36 29.609	41 30.416	21	58.956	59.765	−72.918	23 38 46.038	43 46.847
22	58.431	59.238	−37.063	21 41 21.368	46 22.175	22	54.525	55.334	−74.898	23 42 39.627	47 40.436
23	50.998	51.805	−36.929	21 45 14.069	50 11.876	23	47.849	48.658	−74.870	23 46 32.979	51 33.788
24	43.371	44.178	−36.806	21 49 6.565	54 7.372	24	44.336	45.145	−78.844	23 51 25.492	56 26.301
25	35.700	36.507	−36.681	21 52 59.019	57 59.826	25	48.264	49.073	−88.823	23 54 19.441	59 20.250
26	28.017	28.824	−36.557	21 56 51.460	1 52.267	26	41.239	42.048	−88.808	23 58 12.431	3 13.240
27	22.828	23.635	−40.401	22 2 42.427	7 43.234	27	39.479	40.288	−34.782	0 3 4.697	8 5.506
28	16.966	17.773	−40.269	22 4 36.697	9 37.504	28	36.696	37.505	−38.814	0 6 57.882	11 58.691
29	9.703	10.511	−40.157	22 8 29.546	13 30.354	29	47.626	48.435	−56.742	0 10 50.884	15 51.693
30	2.583	3.391	−40.081	22 12 22.502	17 23.310	30	40.552	41.361	−56.690	0 14 43.862	19 44.671
31	55.297	56.105	−39.964	22 16 15.333	21 16.141	Dec. 1	33.537	34.346	−56.644	0 18 36.893	23 37.702

NO. 5, HONOLULU, NPM, RHYTHMIC SIGNALS, 3^h 30^m TO 3^h 35^m, G. C. T., EAR

Oct. 5	7.96	8.76	−35.15	20 33 32.81	38 33.61 M	Oct. 16	43.19	44.00	−36.16	21 17 7.03	22 7.84 S
9	38.60	39.41	−37.94	20 50 0.66	55 1.47 M	17	35.63	36.44	−35.98	21 20 59.65	26 0.46 M
11	22.79	23.60	−37.39	20 57 45.40	2 46.21 M	19	22.10	22.91	−37.59	21 28 44.51	33 45.32 M
13	6.73	7.54	−36.90	21 5 29.83	10 30.64 M	21	6.79	7.60	−37.22	21 36 29.57	41 30.38 M
15	51.12	51.93	−36.42	21 13 14.70	18 15.51 M						

TABLE XVII.—*Reception of Radio Longitude Signals at San Diego*—Continued

NO. 9, BORDEAUX, LY, RHYTHMIC SIGNALS, $8^h\ 1^m$ TO $8^h\ 6^m$, G. C. T., REGISTRATION

[The times given are for the beginnings of the signals]

Greenwich Date	Seconds of Clock		Clock Correction	San Diego Sidereal Times		Greenwich Date	Seconds of Clock		Clock Correction	San Diego Sidereal Times	
	1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 6	44.635	45.456	−38.776	1 9 5.859	14 6.680	Nov. 15	48.997	49.818	−61.084	3 46 47.913	51 48.734
8	37.139	37.960	−38.182	1 16 58.957	21 59.778	17	54.077	54.898	−73.027	3 54 41.050	59 41.871
18	2.213	3.034	−37.780	1 56 24.433	1 25.254	18	50.587	51.408	−72.956	3 58 37.631	3 38.452
19	58.569	59.390	−37.566	2 0 21.003	5 21.824 [1]	19	47.148	47.969	−72.934	4 2 34.214	7 35.035
22	47.792	48.613	−37.021	2 12 10.771	17 11.592	20	43.738	44.559	−72.914	4 6 30.824	11 31.645
26	33.556	34.377	−36.527	2 27 57.029	32 57.850	22	38.883	39.704	−74.885	4 14 23.998	19 24.819
Nov. 1	16.173	16.994	−39.863	2 51 36.310	56 37.131	23	35.438	36.259	−74.864	4 18 20.574	23 21.395
6	58.536	59.357	−39.479	3 11 19.057	16 19.878	24	35.975	36.796	−78.840	4 22 17.135	27 17.956
7	54.983	55.804	−39.401	3 15 15.582	20 16.403	25	42.423	43.244	−88.816	4 26 13.607	31 14.428
9	47.959	48.780	−39.267	3 23 8.692	28 9.513	26	38.960	39.781	−88.750	4 30 10.210	35 11.031
10	48.413	49.234	−43.268	3 27 5.145	32 5.966	28	44.013	44.834	−40.751	4 38 3.262	43 4.083
11	44.939	45.760	−43.226	3 31 1.713	36 2.534	29	56.527	57.348	−56.720	4 41 59.807	47 0.628
12	41.466	42.287	−43.204	3 34 58.262	39 59.083	30	53.014	53.835	−56.679	4 45 56.335	50 57.156
13	49.995	50.816	−55.154	3 38 54.841	43 55.662	Dec. 1	49.533	50.354	−56.590	4 49 52.943	54 53.764
14	48.473	49.294	−57.104	3 42 51.369	47 52.190						

NO. 9, BORDEAUX, LY, RHYTHMIC SIGNALS, $8^h\ 1^m$ TO $8^h\ 6^m$, G. C. T., EAR

Greenwich Date	1st Signal	306th Signal	Clock Correction	1st Signal	306th Signal	Greenwich Date	1st Signal	306th Signal	Clock Correction	1st Signal	306th Signal
Oct. 2	51.73	52.55	−32.09	0 53 19.64	58 20.46 S	Nov. 2	12.56	13.38	−39.77	2 55 32.79	0 33.61 M
3	51.93	52.75	−35.74	0 57 16.19	2 17.01 M	3	9.04	9.86	−39.71	2 59 29.63	4 30.15 S
4	48.14	48.96	−35.39	1 1 12.75	6 13.57 S	4	5.59	6.41	−39.65	3 3 25.94	8 26.76 M
5	48.38	49.20	−39.09	1 5 9.29	10 10.11 M	6	58.47	59.29	−39.48	3 11 18.99	16 19.81 M
6	44.62	45.44	−38.78	1 9 5.84	14 6.66 S	8	51.35	52.17	−39.26	3 19 12.09	24 12.91 M
7	40.79	41.61	−38.47	1 13 2.32	18 3.14 M	11	44.94	45.76	−43.23	3 31 1.71	36 2.53 S
9	33.27	34.09	−37.89	1 20 55.38	25 56.20 M	12	41.43	42.25	−43.20	3 34 58.23	39 59.05 M
11	25.81	26.63	−37.35	1 28 48.46	33 49.28 M	13	49.98	50.80	−55.15	3 38 54.83	43 55.65 S
13	18.36	19.18	−36.86	1 36 41.50	41 42.32 M	14	48.39	49.21	−57.10	3 42 51.29	47 52.11 M
15	11.08	11.90	−36.37	1 44 34.71	49 35.53 M	15	49.02	49.84	−61.08	3 46 47.94	51 48.76 S
16	7.41	8.23	−36.13	1 48 31.28	53 32.10 S	16	55.44	56.26	−71.04	3 50 44.40	55 45.22 M
17	3.70	4.52	−35.95	1 52 27.75	57 28.57 M	17	54.04	54.86	−73.03	3 54 41.01	59 41.83 S
20	[illegible].96	55.78	−37.41	2 4 17.55	9 18.37 S	18	50.53	51.35	−72.96	3 58 37.57	3 38.39 M
21	51.30	52.12	−37.21	2 8 14.09	13 14.91 M	19	47.15	47.97	−72.93	4 2 34.22	7 35.04 S
22	47.74	48.56	−37.02	2 12 10.72	17 11.54 S	20	43.68	44.50	−72.91	4 6 30.77	11 31.59 M
23	44.22	45.04	−36.91	2 16 7.31	21 8.13 M	22	38.86	39.68	−74.89	4 14 23.97	19 24.79 M
24	40.58	41.40	−36.78	2 20 3.80	25 4.62 S	23	35.45	36.27	−74.86	4 18 20.59	23 21.41 S
25	37.05	37.87	−36.66	2 24 0.39	29 1.21 M	24	36.00	36.82	−78.84	4 22 17.16	27 17.98 M
27	33.94	34.76	−40.38	2 31 53.56	36 54.38 M	25	42.44	43.26	−88.82	4 26 13.62	31 14.44 S
28	30.28	31.10	−40.25	2 35 50.03	40 50.85 S	26	38.88	39.70	−88.75	4 30 10.13	35 10.95 M
29	26.68	27.50	−40.14	2 39 46.54	44.47.36 M	28	43.92	44.74	−40.75	4 38 3.17	43 3.99 M
30	23.17	23.99	−40.05	2 43 43.12	48 43.94 S	29	56.51	57.33	−56.72	4 41 59.79	47 0.61 S
31	19.74	20.56	−39.99	2 47 39.75	52 40.57 M	30	52.95	53.77	−56.68	4 45 56.27	50 57.09 M

NO. 13, ANNAPOLIS, NSS, RHYTHMIC SIGNALS, $10^h\ 10^m$ TO $10^h\ 15^m$, G. C. T., REGISTRATION

Greenwich Date	1st Signal	306th Signal	Clock Correction	1st Signal	306th Signal	Greenwich Date	1st Signal	306th Signal	Clock Correction	1st Signal	306th Signal
Oct. 2	12.919	13.740	−32.060	3 2 40.859	7 41.680	Nov. 4	26.675	27.496	−39.640	5 12 47.035	17 47.856
3	13.074	13.895	−35.704	3 6 37.370	11 38.191	5	23.165	23.986	−39.559	5 16 43.606	21 44.427
4	9.319	10.140	−35.360	3 10 33.959	15 34.780	6	19.688	20.509	−39.475	5 20 40.213	25 41.034
7	1.975	2.796	−38.440	3 22 23.535	27 24.356	7	16.115	16.936	−39.384	5 24 36.731	29 37.552
8	58.254	59.075	−38.156	3 26 20.098	31 20.919	8	12.588	13.409	−39.266	5 28 33.322	33 34.143
9	54.530	55.351	−37.863	3 30 16.667	35 17.488	9	9.135	9.956	−39.267	5 32 29.868	37 30.689
10	50.861	51.682	−37.579	3 34 13.282	39 14.103	10	9.659	10.480	−43.264	5 36 26.395	41 27.216
11	47.153	47.974	−37.330	3 38 9.823	43 10.644	11	6.189	7.010	−43.225	5 40 22.964	45 23.785
12	43.467	44.288	−37.095	3 42 6.372	47 7.193	12	2.671	3.492	−43.200	5 44 19.471	49 20.292
15	32.409	33.230	−36.350	3 53 56.059	58 56.880	13	11.196	12.017	−55.149	5 48 16.047	53 16.868
16	28.680	29.501	−36.112	3 57 52.568	2 53.389	14	9.722	10.543	−57.101	5 52 12.621	57 13.442
17	25.067	25.888	−35.936	4 1 49.131	6 49.952	15	10.261	11.082	−61.079	5 56 9.182	1 10.003
18	23.389	24.210	−37.758	4 5 45.631	10 46.452	16	18.807	19.628	−73.039	6 0 5.768	5 6.589
19	19.766	20.587	−37.553	4 9 42.213	14 43.034	17	15.315	16.136	−73.020	6 4 2.295	9 3.116
20	16.175	16.996	−37.388	4 13 38.787	18 39.608	18	11.793	12.614	−72.955	6 7 58.838	12 59.659
21	12.462	13.283	−37.196	4 17 35.266	22 36.087	19	8.331	9.152	−72.933	6 11 55.398	16 56.219
23	5.401	6.222	−36.896	4 25 28.505	30 29.326	20	4.849	5.670	−72.914	6 15 51.935	20 52.756
24	1.783	2.604	−36.771	4 29 25.012	34 25.833	21	3.463	4.284	−74.924	6 19 48.539	24 49.360
25	58.206	59.027	−36.647	4 33 21.559	38 22.380	22	59.976	0.797	−74.883	6 23 45.093	28 45.914
26	54.616	55.437	−36.513	4 37 18.103	42 18.924	23	56.503	57.350	−74.862	6 27 41.641*	32 42.488*
27	54.969	55.790	−40.365	4 41 14.604	46 15.425	24	57.051	57.872	−78.838	6 31 38.213	36 39.034
28	51.442	52.263	−40.238	4 45 11.204	50 12.025	25	3.533	4.354	−88.813	6 35 34.720	40 35.541
29	47.869	48.690	−40.133	4 49 7.736	54 8.557	26	0.060	0.881	−88.750	6 39 31.310	44 32.131
30	44.348	45.169	−40.040	4 53 4.308	58 5.129	27	4.590	5.411	−36.782	6 43 27.808	48 28.629
31	40.807	41.628	−39.978	4 57 0.829	2 1.650	28	5.155	5.976	−40.746	6 47 24.409	52.25.230
Nov. 1	37.316	38.137	−39.855	5 0 57.461	5 58.282	29	17.711	18.532	−56.716	6 51 20.995	56 21.816
2	33.676	34.497	−39.761	5 4 53.915	9 54.736	30	14.255	15.076	−56.670	6 55 17.585	0 18.406
3	30.229	31.050	−39.702	5 8 50.527	13 51.348						

[1] Zero assumed.

TABLE XVII.—*Reception of Radio Longitude Signals at San Diego*—Continued

NO. 13, ANNAPOLIS, NSS, RHYTHMIC SIGNALS, $10^h\ 10^m$ TO $10^h\ 15^m$, G. C. T., EAR

[The times given are for the beginnings of the signals]

Greenwich Date	Seconds of Clock		Clock Correction	San Diego Sidereal Times		Greenwich Date	Seconds of Clock		Clock Correction	San Diego Sidereal Times	
	1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 3	13.13	13.95	−35.70	3 6 37.43	11 38.25 M	Oct. 23	5.39	6.21	−36.90	4 25 28.49	30 29.31 M
4	9.31	10.13	−35.36	3 10 33.95	15 34.77 S	24	1.74	2.56	−36.77	4 29 24.97	34 25.79 S
5	9.52	10.34	−39.06	3 14 30.46	19 31.28 M	25	58.20	59.02	−36.65	4 33 21.55	38 22.37 M
7	1.88	2.70	−38.44	3 22 23.44	27 24.26 M	27	54.96	55.78	−40.36	4 41 14.60	46 15.42 M
9	54.54	55.36	−37.86	3 30 16.68	35 17.50 M	28	51.43	52.25	−40.24	4 45 11.19	50 12.01 S
11	47.10	47.92	−37.33	3 38 9.77	43 10.59 M	29	47.87	48.69	−40.13	4 49 7.74	54 8.56 M
15	32.40	33.22	−36.35	3 53 56.05	58 56.87 M	30	44.29	45.11	−40.04	4 53 4.25	58 5.07 S
17	25.04	25.86	−35.94	4 1 49.10	6 49.92 M	31	40.79	41.61	−39.98	4 57 0.81	2 1.63 M
18	23.36	24.18	−37.76	4 5 45.60	10 46.42 S	Nov. 1	37.25	38.07	−39.86	5 0 57.39	5 58.21 S
20	16.13	16.95	−37.39	4 13 38.74	18 39.56 S	2	33.68	34.50	−39.76	5 4 53.92	9 54.74 M
22	8.88	9.70	−37.01	4 21 31.87	26 32.69 S	4	26.68	27.50	−39.64	5 12 47.04	14 47.86 M
NO. 15, BELLEVUE, NKF, 75 METERS, RHYTHMIC SIGNALS, $10^h\ 20^m$ TO $10^h\ 25^m$, G. C. T., REGISTRATION											
Oct. 2	14.537	15.358	−32.058	3 12 42.479	17 43.300	Nov. 3	31.855	32.676	−39.701	5 18 52.154	23 52.975
4	10.917	11.738	−35.358	3 20 35.559	25 36.380	4	28.276	29.097	−39.640	5 22 48.636	27 49.457
5	11.098	11.919	−39.058	3 24 32.040	29 32.861	5	24.789	25.610	−39.558	5 26 45.231	31 46.052
7	3.609	4.430	−38.438	3 32 25.171	37 25.992	6	21.293	22.142	−39.475	5 30 41.818*	35 42.667*
8	59.869	0.690	−38.154	3 36 21.715	41 22.536	7	17.730	18.551	−39.382	5 34 38.348	39 39.169
9	56.128	56.949	−37.861	3 40 18.267	45 19.088	8	14.221	15.042	−39.266	5 38 34.955	43 35.776
11	48.779	49.600	−37.328	3 48 11.451	53 12.272	9	10.783	11.604	−39.267	5 42 31.516	47 32.337
12	45.101	45.922	−37.094	3 52 8.007	57 8.828	10	11.298	12.119	−43.264	5 46 28.034	51 28.855
13	41.422	42.243	−36.838	3 56 4.584	1 5.405	11	7.804	8.625	−43.225	5 50 24.579	55 25.400
14	37.610	38.431	−36.598	4 0 1.012	5 1.833	12	4.296	5.117	−43.200	5 54 21.096	59 21.917
15	34.071	34.892	−36.348	4 3 57.723	8 58.544	13	12.809	13.630	−55.149	5 58 17.660	3 18.481
19	21.380	22.201	−37.552	4 19 43.828	24 44.649	14	11.347	12.168	−57.101	6 2 14.246	7 15.067
20	17.755	18.576	−37.386	4 23 40.369	28 41.190	15	11.872	12.693	−61.079	6 6 10.793	11 11.614
21	14.128	14.949	−37.194	4 27 36.934	32 37.755	16	20.449	21.270	−73.039	6 10 7.410	15 8.231
22	10.514	11.335	−37.008	4 31 33.506	36 34.327	17	16.909	17.730	−73.020	6 14 3.889	19 4.710
23	7.016	7.837	−36.895	4 35 30.121	40 30.942	19	9.943	10.764	−72.933	6 21 57.010	26 57.831
24	3.409	4.230	−36.770	4 39 26.639	44 27.460	20	6.482	7.303	−72.914	6 25 53.568	30 54.389
25	59.833	0.654	−36.646	4 43 23.187	48 24.008	21	5.091	5.912	−74.924	6 29 50.167	34 50.988
27	56.614	57.435	−40.364	4 51 16.250	56 17.071	22	1.592	2.413	−74.883	6 33 46.709	38 47.530
28	53.066	53.887	−40.237	4 55 12.829	0 13.650	23	58.159	58.980	−74.862	6 37 43.297	42 44.118
29	49.506	50.327	−40.133	4 59 9.373	4 10.194	25	5.164	5.985	−88.813	6 45 36.351	50 37.172
30	45.971	46.792	−40.039	5 3 5.932	8 6.753	26	1.694	2.515	−88.750	6 49 32.944	54 33.765
31	42.430	43.251	−39.978	5 7 2.452	12 3.273	27	6.213	7.034	−36.782	6 53 29.431	58 30.252
Nov. 1	38.927	39.748	−39.854	5 10 59.073	15 59.894	30	15.892	16.713	−56.670	7 5 19.222	10 20.043
NO. 15, BELLEVUE, NKF, 75 METERS, RHYTHMIC SIGNALS, $10^h\ 20^m$ TO $10^h\ 25^m$, G. C. T., EAR											
Oct. 3	14.63	15.45	−35.70	3 16 38.93	21 39.75 M	Oct. 17	26.67	27.49	−35.94	4 11 50.73	16 51.55 M
NO. 16, HONOLULU, NPM, RHYTHMIC SIGNALS, $10^h\ 30^m$ TO $10^h\ 35^m$, G. C. T., REGISTRATION											
Oct. 2	36.082	36.887	−32.055	3 23 4.027	28 4.832	Nov. 1	55.832	56.640	−39.853	5 21 15.979	26 16.787
3	31.934	32.739	−35.700	3 26 56.234	31 57.039	2	48.590	49.398	−39.760	5 25 8.830	30 9.638
4	23.791	24.596	−35.356	3 30 48.435	35 49.240	3	41.390	42.198	−39.700	5 29 1.690	34 2.498
5	19.606	20.411	−39.056	3 34 40.550	39 41.355	4	34.368	35.176	−39.639	5 32 54.729	37 55.537
6	11.457	12.262	−38.745	3 38 32.712	43 33.517	5	27.390	28.198	−39.558	5 36 47.832	41 48.640
7	2.498	3.303	−38.436	3 43 24.062	48 24.867	6	19.495	20.303	−39.474	5 41 40.021	46 40.829
8	55.179	55.985	−38.152	3 46 17.027	51 17.833	7	12.279	13.088	−39.381	5 45 32.898	50 33.707
9	46.368	47.174	−37.859	3 51 8.509	56 9.315	8	5.056	5.865	−39.266	5 49 25.790	54 26.599
10	38.404	39.210	−37.576	3 55 0.828	0 1.634	9	58.452	59.261	−39.267	5 52 19.185	57 19.994
11	31.298	32.104	−37.327	3 57 53.971	2 54.777	10	54.456	55.265	−43.264	5 57 11.192	2 12.001
12	22.467	23.273	−37.092	4 2 45.375	7 46.181	11	47.341	48.119	−43.225	6 1 4.116*	6 4.894*
13	14.495	15.301	−36.836	4 6 37.659	11 38.465	12	40.064	40.899	−43.200	6 4 56.864*	9 57.699*
14	6.686	7.492	−36.596	4 10 30.090	15 30.896	13	45.598	46.407	−55.149	6 7 50.449	12 51.258
15	58.783	59.589	−36.346	4 14 22.437	19 23.243	14	39.462	40.271	−57.101	6 12 42.361	17 43.170
16	50.985	51.792	−36.109	4 18 14.876	23 15.683	15	36.437	37.246	−61.079	6 16 35.358	21 36.167
17	43.353	44.160	−35.934	4 22 7.419	27 8.226	16	41.465	42.274	−73.039	6 20 28.426	25 29.235
18	37.586	38.393	−37.754	4 25 59.832	31 0.639	17	38.770	39.579	−73.020	6 19 25.750	24 26.559
19	29.877	30.684	−37.551	4 29 52.326	34 53.133	18	27.726	28.535	−72.955	6 28 14.771	33 15.580
20	22.215	23.022	−37.385	4 33 44.830	38 45.637	19	20.793	21.602	−72.933	6 32 7.860	37 8.669
21	14.600	15.407	−37.193	4 37 37.407	42 38.214	20	13.840	14.649	−72.914	6 36 0.926	41 1.735
22	7.110	7.917	−37.007	4 41 30.103	46 30.910	21	9.146	9.955	−74.924	6 39 54.222	44 55.031
23	59.618	0.425	−36.894	4 45 22.724	50 23.531	22	1.760	2.569	−74.883	6 44 46.877	49 47.686
24	51.131	51.938	−36.770	4 50 14.361	55 15.168	23	55.914	56.723	−74.862	6 47 41.052	52 41.861
25	43.471	44.278	−36.645	4 54 6.826	59 7.633	24	52.372	53.181	−78.838	6 52 33.534	57 34.343
26	35.834	36.641	−36.511	4 57 59.323	0.130	25	56.251	57.060	−88.813	6 55 27.438	0 28.247
27	32.292	33.099	−40.363	5 1 51.929	6 52.736	26	49.205	50.014	−88.750	6 59 20.455	4 21.264
28	24.823	25.630	−40.236	5 5 44.587	10 45.394	27	50.333	51.142	−36.782	7 3 13.551	8 14.360
29	17.635	18.443	−40.132	5 9 37.503	14 38.311	28	46.609	47.418	−40.746	7 8 5.863	13 6.672
30	10.485	11.293	−40.039	5 13 30.446	18 31.254	29	55.610	56.419	−56.716	7 11 58.894	16 59.703
31	3.135	3.943	−39.977	5 17 23.158	22 23.966	30	48.539	49.348	−56.670	7 15 51.869	20 52.678

TABLE XVII.—*Reception of Radio Longitude Signals at San Diego*—Continued

NO. 16, HONOLULU, NPM, RHYTHMIC SIGNALS, 10h 30m TO 10h 35m, G. C. T., EAR

[The times given are for the beginnings of the signals]

Greenwich Date	Seconds of Clock		Clock Correction	San Diego Sidereal Times		Greenwich Date	Seconds of Clock		Clock Correction	San Diego Sidereal Times	
	1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 3	31.90	32.70	−35.70	3 26 56.20	31 57.00 M	Oct. 22	7.06	7.87	−37.01	4 41 30.05	46 30.86 S
4	23.79	24.59	−35.36	3 30 48.43	35 49.23 S	23	59.65	0.46	−36.89	4 45 22.76	50 23.57 M
6	11.51	12.31	−38.74	3 38 32.77	43 33.57 S	24	51.12	51.93	−36.77	4 50 14.35	55 15.16 S
7	2.48	3.28	−38.44	3 43 24.04	48 24.84 M	26	35.81	36.62	−36.51	4 57 59.30	3 0.11 S
8	55.20	56.01	−38.15	3 46 17.05	51 17.86 S	27	32.30	33.11	−40.36	5 1 51.94	6 52.75 M
9	46.31	47.12	−37.86	3 51 8.45	56 9.26 M	28	24.79	25.60	−40.24	5 5 44.55	10 45.36 S
10	38.40	39.21	−37.58	3 55 0.82	0 1.63 S	29	17.62	18.43	−40.13	5 9 37.49	14 38.30 M
11	31.25	32.06	−37.33	3 57 53.92	2 54.73 M	30	10.44	11.25	−40.04	5 13 30.40	18 31.21 S
16	50.95	51.76	−36.11	4 18 14.84	23 15.65 S	31	3.13	3.94	−39.98	5 17 23.15	22 23.96 M
17	43.32	44.13	−35.93	4 22 7.39	27 8.20 M	Nov. 1	55.78	56.59	−39.85	5 21 15.93	26 16.74 S
18	37.56	38.37	−37.75	4 25 59.81	31 0.62 S	2	48.50	49.31	−39.76	5 25 8.74	30 9.55 M
19	29.84	30.65	−37.55	4 29 52.29	34 53.10 M	6	19.41	20.22	−39.47	5 41 39.94	46 40.75 M
20	22.21	23.02	−37.38	4 33 44.83	38 45.64 S	10	54.44	55.25	−43.26	5 57 11.18	2 11.99 M
21	14.61	15.42	−37.19	4 37 37.42	42 38.23 M						

MALABAR, PKX, RHYTHMIC SIGNALS, 10h 40m TO 10h 45m, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock		Clock Correction	San Diego Sidereal Times		Greenwich Date	Seconds of Clock		Clock Correction	San Diego Sidereal Times	
	1st Signal	301st Signal		1st Signal	301st Signal		1st Signal	301st Signal		1st Signal	301st Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 10	19.201	14.283	−37.574	4 4 41.628	9 36.710 [1]	Nov. 7	31.477	26.559	−39.380	5 54 52.097	59 47.179
16	9.879	4.961	−36.108	4 [25 33.771]	[30 28.853] [2]	9	25.038	20.120	−39.267	6 2 45.771	7 40.853
18	11.145	6.199	−37.753	4 35 33.392*	40 28.446*	12	22.123	17.205	−45.200	6 14 36.923	19 32.005 [1]
19	38.748	33.830	−37.550	4 [37 1.198]	[41 56.280] [2]	13	30.573	25.655	−55.149	6 18 35.424	23 30.506
20	29.153	24.284	−37.384	4 43 51.769*	48 46.900 [1]*	14	30.740	25.822	−57.101	6 22 33.639	27 28.721
22	27.425	22.507	−37.006	4 51 50.419	56 45.501	15	32.447	27.529	−61.079	6 26 31.368	31 26.450
23	25.696	20.778	−36.893	4 55 48.803	0 43.885	16	42.738	37.820	−73.039	6 30 29.699	35 24.781
24	23.839	18.921	−36.769	4 59 47.070	4 42.152	17	41.281	36.363	−73.020	6 34 28.261	39 23.343
25	23.008	18.090	−36.644	5 3 46.364	8 41.446	19	39.507	34.589	−72.933	6 42 26.574	47 21.656
26	18.072	13.154	−36.510	5 7 41.562	12 36.644 [1]	20	38.873	33.955	−72.914	6 46 25.959	51 21.041
27	58.537	53.619	−40.362	5 11 18.175	16 13.257	21	39.395	34.477	−74.924	6 50 24.471	55 19.553
28	56.873	51.955	−40.235	5 15 16.638	20 11.720	22	37.411	32.493	−74.883	6 54 22.528	59 17.610
29	55.011	50.093	−40.132	5 19 14.879	24 9.961	23	3.697	58.779	−74.862	6 57 48.835	2 43.917
30	53.129	48.211	−40.038	5 23 13.091	28 8.173	24	5.576	0.658	−78.838	7 1 46.738	6 41.820
Nov. 1	48.047	43.129	−39.852	5 31 8.195	36 3.277	26	10.241	5.323	−88.750	7 9 41.491	14 36.573 [1]
2	45.536	40.618	−39.760	5 35 5.776	40 0.858	27	13.550	8.632	−36.782	7 13 36.768	18 31.850
3	42.599	37.681	−39.700	5 39 2.899	43 57.981	30	18.872	13.954	−56.670	7 25 22.202	30 17.284
4	39.841	34.923	−39.639	5 43 0.202	47 55.284	Dec. 1	16.877	11.959	−56.583	7 27 20.294	32 15.376
5	36.974	32.056	−39.557	5 46 57.417	51 52.499						

MALABAR, PKX, RHYTHMIC SIGNALS, 10h 40m TO 10h 45m, G. C. T., EAR

Nov. 3	42.55	37.63	−39.70	5 39 2.85	43 57.93 S	Nov. 9	25.04	20.12	−39.27	6 2 45.77	7 40.85 S
5	36.95	32.03	−39.56	5 46 57.39	51 52.47 S	12	22.12	17.20	−45.20	6 14 36.92	19 32.00 M
7	31.45	26.53	−39.38	5 54 52.07	59 47.15 S	16	42.71	37.79	−73.04	6 30 29.67	35 24.75 M

NO. 19, SAIGON, HZA, RHYTHMIC SIGNALS, 11h 30m TO 11h 35m, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock		Clock Correction	San Diego Sidereal Times		Greenwich Date	Seconds of Clock		Clock Correction	San Diego Sidereal Times	
	1st Signal	300th Signal		1st Signal	300th Signal		1st Signal	300th Signal		1st Signal	300th Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 2	12.127	6.774	−32.040	4 21 40.087	26 34.734 [1]	Oct. 31	46.685	41.284	−39.973	6 15 6.712	20 1.311
3	32.094	26.714	−35.685	4 24 56.409	29 51.029	Nov. 1	55.229	49.849	−39.850	6 19 15.379	24 9.999
4	49.114	43.749	−35.344	4 29 13.770	34 8.405	2	10.676	------	−39.758	6 22 30.918 [1]	-- ------
5	1.355	56.002	−39.041	4 31 22.314	36 16.961	3	52.333	46.953	−39.698	6 26 12.635	31 7.255
6	53.554	48.189	−38.732	4 36 14.822	41 9.457	4	20.699	15.307	−39.636	6 30 41.063	35 35.671
7	8.367	2.987	−38.423	4 39 29.944	44 24.564	5	35.968	30.576	−39.553	6 32 56.415	37 51.023
8	51.665	46.318	−38.140	4 44 13.525	49 8.178 [3]	6	42.534	37.148	−39.472	6 41 3.062	45 57.676
9	32.051	26.701	−37.847	4 47 54.204	52 48.854	7	49.451	44.050	−39.374	6 42 10.077	47 4.676
10	19.371	13.997	−37.565	4 51 41.806	56 36.432	8	11.896	6.501	−39.267	6 44 32.629	49 27.234
11	46.459	41.112	−37.318	4 55 9.141	0 3.794	9	49.717	44.343	−39.266	6 50 10.451	55 5.077
12	33.538	28.179	−37.080	4 58 56.458	3 51.099 [1]	10	9.451	4.074	−43.262	6 53 26.189	58 20.812
13	11.311	5.940	−36.826	5 2 34.485	7 29.114	11	20.921	15.517	−43.224	6 55 37.697	0 32.293
14	12.238	6.882	−36.586	5 6 35.652	11 30.296 [3]	12	32.407	27.012	−45.197	7 0 47.210	5 41.815
15	36.770	31.396	−36.336	5 10 0.434	14 55.060 [3]	13	48.171	42.764	−55.147	7 4 53.024	9 47.617
16	36.377	31.003	−36.101	5 14 0.276	18 54.902	14	25.711	20.286	−57.100	7 7 28.611	12 23.186
17	35.082	29.678	−35.927	5 [17 59.155]	[22 53.751] [2]	15	14.988	9.599	−61.076	7 16 13.912	21 8.523
18	57.754	52.383	−37.745	5 26 20.009	31 14.638	16	8.701	3.291	−73.039	7 19 55.662	24 50.252
19	27.502	22.116	−37.545	5 32 49.957	37 44.571	17	27.293	21.883	−73.017	7 22 14.276	27 8.866
20	5.574	0.212	−37.376	5 34 28.198	39 22.836	18	6.287	0.895	−72.954	7 26 53.333	31 47.941
21	48.417	43.052	−37.186	5 38 11.231	43 5.866	19	34.005	28.622	−72.931	7 31 21.074	36 15.691
22	31.052	25.702	−37.002	5 41 54.050	46 48.700	20	51.749	46.360	−72.914	7 34 38.835	39 33.446
23	40.698	35.330	−36.889	5 46 3.809	50 58.441	21	29.655	24.266	−74.922	7 39 14.733	44 9.344
24	20.854	15.456	−36.764	5 48 44.090	53 38.692	22	31.619	26.239	−74.882	7 43 16.737	48 11.357
25	57.626	52.204	−36.640	5 52 20.986	57 15.564	23	37.540	32.160	−74.860	7 46 22.680	51 17.300
26	51.694	46.305	−36.504	5 57 15.190	2 9.801	24	29.116	23.724	−86.836	7 51 2.280	55 56.888 [1]
28	51.605	46.222	−40.231	6 5 11.374	10 5.991	25	16.924	11.523	−88.810	7 54 48.114	59 42.713
29	8.075	2.683	−40.129	6 8 27.946	13 22.554	26	4.352	58.954	−88.750	7 57 35.602	2 30.204
30	5.665	0.276	−40.035	6 11 25.630	16 20.241						

[1] Zero assumed. [2] Reject; poor record. [3] Minute uncertain.

Table XVII.—*Reception of Radio Longitude Signals at San Diego*—Continued

NO. 19, SAIGON, HZA, RHYTHMIC SIGNALS, $11^h 30^m$ TO $11^h 35^m$, G. C. T., EAR

[The times given are for the beginnings of the signals]

Greenwich Date	Seconds of Clock, 1st Signal	Seconds of Clock, 300th Signal	Clock Correction	San Diego Sidereal Times, 1st Signal	San Diego Sidereal Times, 300th Signal	Greenwich Date	Seconds of Clock, 1st Signal	Seconds of Clock, 300th Signal	Clock Correction	San Diego Sidereal Times, 1st Signal	San Diego Sidereal Times, 300th Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 3	32.02	26.64	−35.68	4 24 56.34	29 50.96 M	Oct. 21	48.38	43.02	−37.19	5 38 11.19	43 5.83 M
6	53.56	48.20	−38.73	4 36 14.83	41 9.47 S	31	46.72	41.32	−39.97	6 15 6.75	20 1.35 M
7	8.35	2.97	−38.42	4 39 29.93	44 24.55 M	Nov. 3	52.32	46.94	−39.70	6 26 12.62	31 7.24 S
9	32.00	26.65	−37.85	4 47 54.15	52 48.80 M	8	11.80	6.40	−39.27	6 44 32.53	49 27.13 M
11	46.49	41.14	−37.32	4 55 9.17	0 3.82 M	10	9.43	4.05	−43.26	6 53 26.17	58 20.79 M
19	27.48	22.09	−37.54	5 32 49.94	37 44.55 M	22	31.62	26.24	−74.88	7 43 16.74	48 11.36 M

NO. 28, ANNAPOLIS, NSS, RHYTHMIC SIGNALS, $20^h 10^m$ TO $20^h 15^m$, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock, 1st Signal	Seconds of Clock, 306th Signal	Clock Correction	San Diego Sidereal Times, 1st Signal	San Diego Sidereal Times, 306th Signal	Greenwich Date	Seconds of Clock, 1st Signal	Seconds of Clock, 306th Signal	Clock Correction	San Diego Sidereal Times, 1st Signal	San Diego Sidereal Times, 306th Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 3	51.480	52.301	−35.552	13 8 15.928	13 16.749	Nov. 4	5.247	6.068	−39.611	15 14 25.636	19 26.457
5	47.907	48.728	−38.928	13 16 8.979	21 9.800	5	1.758	2.579	−39.516	15 18 22.242	23 23.063
7	40.439	41.260	−38.327	13 24 2.112	29 2.933	6	58.163	58.984	−39.457	15 22 18.706	27 19.527
8	36.737	37.558	−38.034	13 27 58.703	32 59.524	7	54.599	55.441	−39.306	15 26 15.293*	31 16.135*
9	32.997	33.818	−37.742	13 31 55.255	36 56.076	8	51.161	51.982	−39.270	15 30 11.891	35 12.712
11	25.590	26.433	−37.238	13 39 48.352*	44 49.195*	9	49.710	50.531	−41.273	15 34 8.437	39 9.258
12	21.977	22.825	−36.984	13 43 44.993*	48 45.841*	10	48.188	49.009	−43.246	15 38 4.942	43 5.763
13	18.229	19.050	−36.741	13 47 41.488	52 42.309	11	44.711	45.532	−43.219	15 42 1.492	47 2.313
15	10.812	11.633	−36.242	13 55 34.570	0 35.391	12	47.181	48.002	−49.178	15 45 58.003	50 58.824
16	7.173	7.994	−36.033	13 59 31.140	4 31.961	13	49.760	50.581	−55.131	15 49 54.629	54 55.450
17	5.536	6.357	−37.874	14 3 27.662	8 28.483	14	52.298	53.119	−61.097	15 53 51.201	58 52.022
18	1.893	2.714	−37.660	14 7 24.233	12 25.054	15	48.783	49.631	−61.057	15 57 47.726*	2 48.574*
19	58.276	59.097	−37.493	14 11 20.783	16 21.604	16	57.283	58.104	−73.033	16 1 44.250	6 45.071
20	54.655	55.476	−37.300	14 15 17.355	20 18.176	17	53.795	54.616	−72.990	16 5 40.805	10 41.626
21	51.044	51.865	−37.113	14 19 13.931	24 14.752	18	50.376	51.197	−72.955	16 9 37.421	14 38.242
22	47.475	48.296	−36.968	14 23 10.507	28 11.328	19	46.898	47.719	−72.935	16 13 33.963	18 34.784
23	43.884	44.705	−36.844	14 27 7.040	32 7.861	20	43.479	44.300	−72.923	16 17 30.556	22 31.377
25	36.767	37.588	−36.596	14 35 0.171	40 0.992	21	42.045	42.866	−74.904	16 21 27.141	26 27.962
26	33.067	33.888	−36.446	14 38 56.621	43 57.442	22	38.546	39.395	−74.877	16 25 23.669*	30 24.518*
27	33.522	34.343	−40.309	14 42 53.213	47 54.034	24	43.631	44.452	−86.829	16 33 16.802	38 17.623
28	30.056	30.877	−40.190	14 46 49.866	51 50.687	25	42.119	42.940	−88.796	16 37 13.323	42 14.144
29	26.420	27.241	−40.099	14 50 46.321	55 47.142	26	42.625	43.446	−92.781	16 41 9.844	46 10.665
31	19.289	20.110	−39.912	14 58 39.377	3 40.198	27	45.137	45.958	−38.783	16 45 6.354	50 7.175
Nov. 1	15.801	16.622	−39.814	15 2 35.987	7 36.808	28	49.697	50.518	−46.750	16 49 2.947	54 3.768
2	12.252	13.073	−39.746	15 6 32.506	11 33.327	29	56.266	57.110	−56.704	16 52 59.562*	58 0.406*
3	8.734	9.555	−39.682	15 10 29.052	15 29.873	30	52.802	53.623	−56.641	16 56 56.161	1 56.982

NO. 31, HONOLULU, NPM, RHYTHMIC SIGNALS, $20^h 30^m$ TO $20^h 35^m$, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock, 1st Signal	Seconds of Clock, 306th Signal	Clock Correction	San Diego Sidereal Times, 1st Signal	San Diego Sidereal Times, 306th Signal	Greenwich Date	Seconds of Clock, 1st Signal	Seconds of Clock, 306th Signal	Clock Correction	San Diego Sidereal Times, 1st Signal	San Diego Sidereal Times, 306th Signal
Oct. 3	8.635	9.440	−35.548	13 28 33.087	33 33.892	Nov. 3	18.506	19.314	−39.680	15 30 38.826	35 39.634
5	56.223	57.028	−38.924	13 36 17.299	41 18.104	4	11.450	12.258	−39.610	15 34 31.840	39 32.648
6	48.086	48.891	−38.621	13 40 9.465	45 10.270	5	3.733	4.541	−39.514	15 39 24.219	44 25.027
7	39.905	40.710	−38.324	13 44 1.581	49 2.386	6	56.517	57.325	−39.457	15 43 17.060	48 17.868
8	30.973	31.778	−38.030	13 48 52.943	53 53.748	7	49.304	50.113	−39.304	15 47 10.000	52 10.809
9	23.040	23.846	−37.737	13 52 45.303	57 46.109	8	41.940	42.749	−39.270	15 51 2.670	56 3.479
11	7.171	7.977	−37.235	14 0 29.936	5 30.742	9	36.666	37.475	−41.273	15 54 55.393	59 56.202
12	59.104	59.910	−36.981	14 4 22.123	9 22.929	10	31.536	32.345	−43.246	15 58 48.290	3 49.099
13	51.209	52.015	−36.737	14 8 14.472	13 15.278	11	24.270	25.079	−43.219	16 2 41.051	7 41.860
14	43.451	44.257	−36.496	14 12 6.955	17 7.761	12	23.068	23.877	−49.178	16 6 33.890	11 34.699
15	35.526	36.332	−36.238	14 15 59.288	21 0.094	13	21.686	22.495	−55.131	16 10 26.555	15 27.364
16	27.820	28.666	−36.030	14 19 51.790*	24 52.636*	14	20.517	21.326	−61.097	16 14 19.420	19 20.229
17	22.172	22.979	−37.871	14 23 44.301	28 45.108	15	13.539	14.348	−61.057	16 18 12.482	23 13.291
18	14.399	15.170	−37.657	14 27 36.742*	32 37.513*	16	18.655	19.464	−73.033	16 22 5.622	27 6.431
19	6.647	7.454	−37.491	14 31 29.156	36 29.963	17	11.794	12.603	−72.990	16 25 58.804	30 59.613
20	59.061	59.868	−37.298	14 35 21.763	40 22.570	18	4.859	5.668	−72.955	16 29 51.904	34 52.713
21	51.478	52.285	−37.110	14 39 14.368	44 15.175	19	57.963	58.772	−72.935	16 33 45.028	38 45.837
22	44.066	44.873	−36.966	14 43 7.100	48 7.907	20	50.943	51.752	−72.923	16 37 38.020	42 38.829
23	35.615	36.422	−36.841	14 47 58.774	52 59.581	21	46.519	47.328	−74.904	16 41 31.615	46 32.424
25	20.298	21.105	−36.594	14 55 43.704	0 44.511	22	38.977	39.786	−74.877	16 46 24.100	51 24.909
26	12.701	13.508	−36.444	14 59 36.257	4 37.064	24	37.516	38.325	−86.829	16 54 10.687	59 11.496
27	9.161	9.968	−40.307	15 3 28.854	8 29.661	25	32.524	33.333	−88.796	16 58 3.728	3 4.537
28	1.792	2.599	−40.188	15 7 21.604	12 22.411	26	29.486	30.323	−92.781	17 1 56.705*	6 57.542*
29	54.688	55.496	−40.098	15 11 14.590	16 15.398	27	28.724	29.533	−38.783	17 5 49.941	10 50.750
31	40.077	40.885	−39.910	15 19 0.167	24 0.975	28	31.699	32.508	−48.750	17 9 42.949	14 43.758
Nov. 1	32.825	33.633	−39.813	15 22 53.012	27 53.820	29	32.614	33.447	−56.704	17 13 35.910*	18 36.743*
2	25.594	26.402	−39.745	15 26 45.849	31 46.657	30	25.633	26.442	−56.641	17 17 28.992	22 29.801

TABLE XVIII.—*Reception of Radio Longitude Signals at Washington*

NO. 1, ANNAPOLIS, NSS, TIME SIGNALS, $2^h\ 55^m$ TO $3^h\ 0^m$, G. C. T., REGISTRATION

[The times given are for the beginnings of the signals]

Greenwich Date	Seconds of Clock		Clock Correction	Washington Sidereal Times		Greenwich Date	Seconds of Clock		Clock Correction	Washington Sidereal Times	
	1st Signal	301st Signal		1st Signal	301st Signal		1st Signal	301st Signal		1st Signal	301st Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 2	20.904	21.725	−18.986	22 27 1.918	32 2.739	Nov. 1	36.040	36.861	−17.486	0 25 18.554	30 19.375
3	17.453	18.274	−18.927	22 30 58.526	35 59.347	2	32.564	33.385	−17.446	0 29 15.118	34 15.939
4	13.929	14.750	−18.868	22 34 55.061	39 55.882	3	29.012	29.833	−17.400	0 33 11.612	38 12.433
5	10.428	11.249	−18.817	22 38 51.611	43 52.432	4	25.566	26.387	−17.363	0 37 8.203	42 9.024
6	6.909	7.730	−18.786	22 42 48.123	47 48.944	5	22.096	22.917	−17.327	0 41 4.769	46 5.590
7	3.484	4.305	−18.754	22 46 44.730	51 45.551	6	18.571	19.392	−17.265	0 45 1.306	50 2.127
8	59.998	0.819	−18.724	22 50 41.274	55 42.095	7	15.073	15.894	−17.235	0 48 57.838	53 58.659
9	56.505	57.326	−18.683	22 54 37.822	59 38.643	8	11.614	12.435	−17.185	0 52 54.429	57 55.250
10	53.016	53.837	−18.618	22 58 34.398	3 35.219	9	8.132	8.953	−17.140	0 56 50.992	1 51.813
11	49.520	50.341	−18.564	23 2 30.956	7 31.777	10	4.665	5.486	−17.094	1 0 47.571	5 48.392
12	46.048	46.869	−18.503	23 6 27.545	11 28.366	11	1.179	2.000	−17.049	1 4 44.130	9 44.951
13	42.521	43.342	−18.443	23 10 24.078	15 24.899	12	57.664	58.485	−17.016	1 8 40.648	13 41.469
14	39.020	39.841	−18.383	23 14 20.637	19 21.458	13	54.100	54.921	−16.971	1 12 37.129	17 37.950
15	35.498	36.319	−18.324	23 18 17.174	23 17.995	14	50.696	51.517	−16.917	1 16 33.779	21 34.600
16	31.954	32.775	−18.279	23 22 13.675	27 14.496	15	47.234	48.055	−16.863	1 20 30.371	25 31.192
17	28.520	29.341	−18.215	23 26 10.305	31 11.126	16	43.712	44.533	−16.825	1 24 26.887	29 27.708
18	24.982	25.803	−18.154	23 30 6.828	35 7.649	17	40.196	41.017	−16.785	1 28 23.411	33 24.232
19	21.505	22.326	−18.120	23 34 3.385	39 4.206	18	36.732	37.553	−16.740	1 32 19.992	37 20.813
20	17.967	18.788	−18.072	23 37 59.895	43 0.716	19	33.241	34.062	−16.710	1 36 16.531	41 17.352
21	14.506	15.327	−18.026	23 41 56.480	46 57.301	21	26.291	27.112	−16.628	1 44 9.663	49 10.484
22	10.986	11.807	−17.966	23 45 53.020	50 53.841	22	22.846	23.667	−16.580	1 48 6.266	53 7.087
23	7.575	8.396	−17.924	23 49 49.651	54 50.472	23	19.333	20.154	−16.532	1 52 2.801	57 3.622
24	4.015	4.836	−17.871	23 53 46.144	58 46.965	24	15.841	16.662	−16.484	1 55 59.357	1 0.178
25	0.445	1.266	−17.819	23 57 42.626	2 43.447	25	12.377	13.198	−16.445	1 59 55.932	4 56.753
26	57.058	57.879	−17.767	0 1 39.291	6 40.112	26	8.850	9.671	−16.420	2 3 52.430	8 53.251
27	53.549	54.370	−17.708	0 5 35.841	10 36.662	27	5.365	6.186	−16.394	2 7 48.971	12 49.792
28	50.021	50.842	−17.681	0 9 32.340	14 33.161	28	1.871	2.692	−16.367	2 11 45.504	16 46.325
29	46.564	47.385	−17.637	0 13 28.927	18 29.748	29	58.461	59.282	−16.341	2 15 42.120	20 42.941
30	43.047	43.868	−17.587	0 17 25.460	22 26.281	30	54.990	55.811	−16.290	2 19 38.700	24 39.521
31	39.531	40.352	−17.536	0 21 21.995	26 22.816	Dec. 1	51.504	52.325	−16.240	2 23 35.264	28 36.085

NO. 2, ANNAPOLIS, NSS, RHYTHMIC SIGNALS, $3^h\ 10^m$ TO $3^h\ 15^m$, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock		Clock Correction	Washington Sidereal Times		Greenwich Date	Seconds of Clock		Clock Correction	Washington Sidereal Times	
	1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 2	23.390	24.211	−18.986	22 42 4.404	47 5.225	Nov. 1	38.520	39.341	−17.486	0 40 21.034	45 21.855
3	19.871	20.717	−18.927	22 46 0.944*	51 1.790*	2	34.991	35.812	−17.446	0 44 17.545	49 18.366
4	16.365	17.186	−18.868	22 49 57.497	54 58.318	3	31.506	32.327	−17.400	0 48 14.106	53 14.927
5	12.917	13.738	−18.817	22 53 54.100	58 54.921	4	28.025	28.846	−17.363	0 52 10.662	57 11.483
6	9.314	10.135	−18.786	22 57 50.528	2 51.349	5	24.524	25.345	−17.327	0 56 7.197	1 8.018
7	5.924	6.745	−18.754	23 1 47.170	6 47.991	6	21.083	21.904	−17.265	1 0 3.818	5 4.639
8	2.410	3.231	−18.724	23 5 43.686	10 44.507	7	17.464	18.285	−17.235	1 4 0.229	9 1.050
9	58.881	59.702	−18.683	23 9 40.198	14 41.019	8	14.157	14.978	−17.185	1 7 56.972	12 57.793
10	55.342	56.213	−18.618	23 13 36.774	18 37.595	9	10.578	11.399	−17.140	1 11 53.438	16 54.259
11	51.971	52.792	−18.564	23 17 33.407	22 34.228	10	7.126	7.947	−17.094	1 15 50.032	20 50.853
12	48.513	49.334	−18.503	23 21 30.010	26 30.831	11	3.623	4.444	−17.049	1 19 46.574	24 47.395
13	45.005	45.826	−18.443	23 25 26.562	30 27.383	12	0.158	0.979	−17.016	1 23 43.142	28 43.963
14	41.474	42.295	−18.383	23 29 23.091	34 23.912	13	56.979	57.800	−16.971	1 27 40.008	32 40.829
15	37.992	38.813	−18.324	23 33 19.668	38 20.489	14	53.177	53.998	−16.917	1 31 36.260	36 37.081
16	34.380	35.201	−18.279	23 37 16.101	42 16.922	15	49.703	50.524	−16.863	1 35 32.840	40 33.661
17	30.959	31.780	−18.215	23 41 12.744	46 13.565	16	46.179	47.000	−16.825	1 39 29.354	44 30.175
18	27.479	28.300	−18.154	23 45 9.325	50 10.146	17	42.673	43.494	−16.785	1 43 25.888	48 26.709
19	23.954	24.775	−18.120	23 49 5.834	54 6.655	18	39.179	40.000	−16.740	1 47 22.439	52 23.260
20	20.387	21.208	−18.072	23 53 2.315	58 3.136	19	35.699	36.520	−16.710	1 51 18.989	56 19.810
21	16.954	17.775	−18.026	23 56 58.928	1 59.749	21	28.769	29.590	−16.628	1 59 12.141	4 12.962
22	13.475	14.296	−17.966	0 0 55.509	5 56.330	22	25.265	26.086	−16.580	2 3 8.685	8 9.506
23	9.943	10.764	−17.924	0 4 52.019	9 52.840	23	21.810	22.631	−16.532	2 7 5.278	12 6.099
24	6.519	7.340	−17.871	0 8 48.648	13 49.469	24	18.319	19.140	−16.484	2 11 1.835	16 2.656
25	3.025	3.846	−17.819	0 12 45.206	17 46.027	25	14.791	15.612	−16.445	2 14 58.346	19 59.167
26	59.509	0.330	−17.767	0 16 41.742	21 42.563	26	11.383	12.204	−16.420	2 18 54.963	23 55.784
27	56.011	56.832	−17.708	0 20 38.303	25 39.124	27	7.828	8.649	−16.394	2 22 51.434	27 52.255
28	52.436	53.257	−17.681	0 24 34.755	29 35.576	28	4.394	5.215	−16.367	2 26 48.027	31 48.848
29	49.009	49.830	−17.637	0 28 31.372	33 32.193	29	0.922	1.743	−16.341	2 30 44.581	35 45.402
30	45.519	46.340	−17.587	0 32 27.932	37 28.753	30	57.470	58.291	−16.290	2 34 41.180	39 42.001
31	42.017	42.838	−17.536	0 36 24.481	41 25.302	Dec. 1	53.991	54.812	−16.240	2 38 37.751	43 38.572

TABLE XVIII.—*Reception of Radio Longitude Signals at Washington*—Continued

NO. 3, BELLEVUE, NKF, 25 METERS, RHYTHMIC SIGNALS, $3^h\ 20^m$ TO $3^h\ 25^m$, G. C. T., REGISTRATION

[The times given are for the beginnings of the signals]

Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal	Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 5	14.513	15.334	−18.817	23 3 55.696	8 56.517	Oct. 27	57.623	58.444	−17.708	0 30 39.915	35 40.736
7	7.573	8.394	−18.754	23 11 48.819	16 49.640	29	50.648	51.469	−17.637	0 38 33.011	43 33.832
8	4.076	4.897	−18.724	23 15 45.352	20 46.173	31	43.681	44.502	−17.536	0 46 26.145	51 26.966
10	57.013	57.834	−18.618	23 23 38.395	28 39.216	Nov. 2	36.657	37.478	−17.446	0 54 19.211	59 20.032
12	50.167	50.988	−18.503	23 31 31.664	36 32.485	4	29.711	30.532	−17.363	1 2 12.348	7 13.169
13	46.664	47.485	−18.443	23 35 28.221	40 29.042	12	1.770	2.591	−17.016	1 33 44.754	38 45.575
14	43.119	43.940	−18.383	23 39 24.736	44 25.557	13	58.500	59.321	−16.971	1 37 41.529	42 42.350
15	39.646	40.467	−18.324	23 43 21.322	48 22.143	15	51.377	52.198	−16.863	1 45 34.514	50 35.335
17	32.619	33.440	−18.215	23 51 14.404	56 15.225	17	44.337	45.158	−16.785	1 53 27.552	58 28.373
18	29.111	29.932	−18.154	23 55 10.957	0 11.778	19	37.380	38.201	−16.710	2 1 20.670	6 21.491
21	18.571	19.392	−18.026	0 7 0.545	12 1.366	20	33.839	34.660	−16.674	2 5 17.165	10 17.986
22	15.120	15.941	−17.966	0 10 57.154	15 57.975	21	30.389	31.210	−16.628	2 9 13.761	14 14.582
24	8.185	9.006	−17.871	0 18 50.314	23 51.135	26	13.034	13.855	−16.420	2 28 56.614	33 57.435
25	4.679	5.500	−17.819	0 22 46.860	27 47.681						

NO. 4, BELLEVUE, NKF, 75 METERS, RHYTHMIC SIGNALS, $3^h\ 20^m$ TO $3^h\ 25^m$, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal	Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal
Oct. 2	25.010	25.831	−18.986	22 52 6.024	57 6.845	Nov. 1	40.163	40.984	−17.486	0 50 22.677	55 23.498
3	21.515	22.336	−18.927	22 56 2.588	1 3.409	2	36.617	37.438	−17.446	0 54 19.171	59 19.992
5	14.506	15.327	−18.817	23 3 55.689	8 56.510	3	33.128	33.949	−17.400	0 58 15.728	3 16.549
6	10.923	11.744	−18.786	23 7 52.137	12 52.958	4	29.668	30.489	−17.363	1 2 12.305	7 13.126
7	7.556	8.377	−18.754	23 11 48.802	16 49.623	5	26.150	26.971	−17.327	1 6 8.823	11 9.644
8	4.040	4.861	−18.724	23 15 45.316	20 46.137	6	22.722	23.543	−17.265	1 10 5.457	15 6.278
9	0.496	1.317	−18.683	23 19 41.813	24 42.634	7	19.099	19.920	−17.235	1 14 1.864	19 2.685
10	57.007	57.828	−18.618	23 23 38.389	28 39.210	8	15.800	16.621	−17.185	1 17 58.615	22 59.436
11	53.607	54.428	−18.564	23 27 35.043	32 35.864	9	12.207	13.028	−17.140	1 21 55.067	26 55.888
12	50.147	50.968	−18.503	23 31 31.644	36 32.465	11	5.249	6.070	−17.049	1 29 48.200	34 49.021
13	46.637	47.458	−18.443	23 35 28.194	40 29.015	12	1.743	2.564	−17.016	1 33 44.727	38 45.548
14	43.094	43.915	−18.383	23 39 24.711	44 25.532	13	58.442	59.263	−16.971	1 37 41.471	42 42.292
15	39.624	40.445	−18.324	23 43 21.300	48 22.121	15	51.340	52.161	−16.863	1 45 34.477	50 35.298
16	36.016	36.837	−18.279	23 47 17.737	52 18.558	16	47.803	48.624	−16.825	1 49 30.978	54 31.799
17	32.569	33.390	−18.215	23 51 14.354	56 15.175	17	44.309	45.130	−16.785	1 53 27.524	58 28.345
18	29.102	29.923	−18.154	23 55 10.948	0 11.769	18	40.829	41.650	−16.740	1 57 24.089	2 24.910
19	25.558	26.379	−18.120	23 59 7.438	4 8.259	19	37.341	38.162	−16.710	2 1 20.631	6 21.452
20	21.985	22.806	−18.072	0 3 3.913	8 4.734	20	33.841	34.662	−16.674	2 5 17.167	10 17.988
21	18.535	19.356	−18.026	0 7 0.509	12 1.330	21	30.356	31.177	−16.628	2 9 13.728	14 14.549
22	15.090	15.911	−17.966	0 10 57.124	15 57.945	22	26.895	27.716	−16.580	2 13 10.315	18 11.136
24	8.146	8.967	−17.871	0 18 50.275	23 51.096	24	19.921	20.742	−16.484	2 21 3.437	26 4.258
25	4.655	5.476	−17.819	0 22 46.836	27 47.657	25	16.434	17.255	−16.445	2 24 59.989	30 0.810
26	1.119	1.940	−17.767	0 26 43.352	31 44.173	26	13.004	13.825	−16.420	2 28 56.584	33 57.405
27	57.610	58.431	−17.708	0 30 39.902	35 40.723	27	9.438	10.259	−16.394	2 32 53.044	37 53.865
28	54.032	54.853	−17.681	0 34 36.351	39 37.172	28	5.972	6.793	−16.367	2 36 49.605	41 50.426
29	50.625	51.446	−17.637	0 38 32.988	43 33.809	29	2.546	3.367	−16.341	2 40 46.205	45 47.026
30	47.156	47.977	−17.587	0 42 29.569	47 30.390	30	59.109	59.930	−16.290	2 44 42.819	49 43.640
31	43.647	44.468	−17.536	0 46 26.111	51 26.932	Dec. 1	55.617	56.438	−16.240	2 48 39.377	53 40.198

NO. 5, HONOLULU, NPM, RHYTHMIC SIGNALS, $3^h\ 30^m$ TO $3^h\ 35^m$, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal	Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal
Nov. 19	49.202	50.011	−16.710	2 11 32.492	16 33.301	Nov. 22	28.845	29.654	−16.580	2 23 12.265	28 13.074

NO. 6, HONOLULU, NPM, RHYTHMIC SIGNALS, $3^h\ 40^m$ TO $3^h\ 45^m$, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal	Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal
Oct. 5	15.240	16.045	−18.817	23 24 56.423	29 57.228	Nov. 10	44.810	45.619	−17.094	1 46 27.716	51 28.525
28	20.050	20.857	−17.681	0 55 2.369	0 3.176[1]	23	13.921	14.730	−16.532	2 36 57.389	41 58.198
31	57.324	58.132	−17.536	1 6 39.788	11 40.596	29	31.687	32.496	−16.341	3 1 15.346	6 16.155
Nov. 5	20.746	21.554	−17.327	1 27 3.419	32 4.227						

[1] Uncertain; poor record.

TABLE XVIII.—*Reception of Radio Longitude Signals at Washington*—Continued

NO. 9, BORDEAUX, LY, RHYTHMIC SIGNALS, $8^h 1^m$ TO $8^h 6^m$, G. C. T., REGISTRATION

[The times given are for the beginnings of the signals]

Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal	Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 3	7.722	8.543	−18.915	3 37 48.807	42 49.628	Nov. 4	15.942	16.763	−17.357	5 43 58.585	48 59.406
4	4.208	5.080	−18.858	3 41 45.350*	46 46.222*	5	12.422	13.243	−17.314	5 47 55.108	52 55.929
6	57.283	58.104	−18.780	3 49 38.503	54 39.324	6	8.907	9.728	−17.260	5 51 51.647	56 52.468
10	43.256	44.077	−18.607	4 5 24.649	10 25.470	7	5.408	6.229	−17.225	5 55 48.183	0 49.004
11	39.702	40.523	−18.551	4 9 21.151	14 21.972	8	1.880	2.701	−17.177	5 59 44.703	4 45.524
12	36.194	37.015	−18.491	4 13 17.703	18 18.524	9	58.379	59.200	−17.131	6 3 41.248	8 42.069
13	32.683	33.504	−18.430	4 17 14.253	22 15.074	10	54.859	55.680	−17.085	6 7 37.774	12 38.595
14	29.157	29.978	−18.370	4 21 10.787	26 11.608	11	51.389	52.210	−17.041	6 11 34.348	16 35.169
15	25.681	26.502	−18.316	4 25 7.365	30 8.186	12	47.936	48.757	−17.008	6 15 30.928	20 31.749
16	22.201	23.022	−18.267	4 29 3.934	34 4.755	13	44.415	45.236	−16.961	6 19 27.454	24 28.275
17	18.707	19.528	−18.202	4 33 0.505	38 1.326	14	40.903	41.724	−16.906	6 23 23.997	28 24.818
18	15.226	16.071	−18.147	4 36 57.079*	41 57.924*	15	37.380	38.201	−16.856	6 27 20.524	32 21.345
19	11.722	12.543	−18.110	4 40 53.612	45 54.433	16	33.915	34.736	−16.816	6 31 17.099	36 17.920
20	8.313	9.134	−18.064	4 44 50.249	49 51.070	17	30.457	31.278	−16.777	6 35 13.657*	40 14.501*
21	4.765	5.586	−18.014	4 48 46.751	53 47.572	18	27.003	27.824	−16.734	6 39 10.269	44 11.090
22	1.322	2.143	−17.958	4 52 43.364	57 44.185	19	23.547	24.368	−16.704	6 43 6.843	48 7.664
23	57.838	58.659	−17.913	4 56 39.925	1 40.746	20	20.093	20.914	−16.665	6 47 3.428	52 4.249
24	54.318	55.165	−17.861	5 0 36.457*	5 37.304*	22	13.172	13.993	−16.570	6 54 56.602	59 57.423
25	50.866	51.687	−17.809	5 4 33.057	9 33.878	23	9.677	10.498	−16.523	6 58 53.154	3 53.975
26	47.384	48.229	−17.755	5 8 29.629*	13 30.474*	24	6.198	7.019	−16.476	7 2 49.722	7 50.543
27	43.916	44.758	−17.700	5 12 26.216*	17 27.058*	25	2.712	3.504	−16.440	7 6 46.272*	11 47.064*
28	40.401	41.222	−17.673	5 16 22.728	21 23.549	26	59.194	0.015	−16.414	7 10 42.780	15 43.601
29	36.906	37.727	−17.627	5 20 19.279	25 20.100	28	52.239	53.060	−16.363	7 18 35.876	23 36.697
30	33.401	34.222	−17.577	5 24 15.824	29 16.645	29	48.746	49.567	−16.330	7 22 32.416	27 33.237
31	29.912	30.733	−17.526	5 28 12.386	33 13.207	30	45.228	46.049	−16.280	7 26 28.948	31 29.769
Nov. 1	26.403	27.224	−17.477	5 32 8.926	37 9.747	Dec. 1	41.741	42.562	−16.230	7 30 25.511	35 26.332
3	19.419	20.240	−17.392	5 40 2.027	45 2.848						

NO. 13, ANNAPOLIS, NSS, RHYTHMIC SIGNALS, $10^h 10^m$ TO $10^h 15^m$, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal	Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal
Oct. 2	32.363	33.184	−18.965	5 43 13.398	48 14.219	Nov. 1	47.544	48.365	−17.474	7 41 30.070	46 30.891
3	28.850	29.671	−18.909	5 47 9.941	52 10.762	2	43.953	44.774	−17.432	7 45 26.521	50 27.342
4	25.411	26.232	−18.853	5 51 6.558	56 7.379	3	40.519	41.340	−17.388	7 49 23.131	54 23.952
5	21.866	22.710	−18.806	5 55 3.060*	0 3.904*	4	37.003	37.824	−17.354	7 53 19.649	58 20.470
6	18.371	19.192	−18.777	5 58 59.594	4 0.415	5	33.529	34.350	−17.308	7 57 16.221	2 17.042
7	14.918	15.739	−18.745	6 2 56.173	7 56.994	6	30.065	30.886	−17.257	8 1 12.808	6 13.629
8	11.436	12.257	−18.712	6 6 52.724	11 53.545	7	26.555	27.376	−17.220	8 5 9.335	10 10.156
9	7.925	8.746	−18.664	6 10 49.261	15 50.082	8	23.061	23.882	−17.172	8 9 5.889	14 6.710
10	4.488	5.309	−18.602	6 14 45.886	19 46.707	9	19.571	20.392	−17.127	8 13 2.444	18 3.265
11	0.958	1.779	−18.546	6 18 42.412	23 43.233	10	16.119	16.940	−17.081	8 16 59.038	21 59.859
12	57.479	58.300	−18.485	6 22 38.994	27 39.815	11	12.628	13.449	−17.038	8 20 55.590	25 56.411
13	53.968	54.789	−18.425	6 26 35.543	31 36.364	12	9.107	9.928	−17.004	8 24 52.103	29 52.924
14	50.382	51.203	−18.365	6 30 32.017	35 32.838	13	5.610	6.431	−16.955	8 28 48.655	33 49.476
15	46.992	47.813	−18.312	6 34 28.680	39 29.501	14	2.151	2.972	−16.900	8 32 45.251	37 46.072
16	43.417	44.238	−18.260	6 38 25.157	43 25.978	15	58.666	59.487	−16.852	8 36 41.814	41 42.635
17	39.960	40.781	−18.196	6 42 21.764	47 22.585	16	55.194	56.015	−16.813	8 40 38.381	45 39.202
18	36.434	37.255	−18.144	6 46 18.290	51 19.111	17	51.662	52.515	−16.773	8 44 34.889*	49 35.742*
19	32.921	33.742	−18.106	6 50 14.815	55 15.636	18	48.200	49.021	−16.731	8 48 31.469	53 32.290
20	29.447	30.268	−18.060	6 54 11.387	59 12.208	19	44.689	45.533	−16.700	8 52 27.989*	57 28.833*
21	25.907	26.728	−18.008	6 58 7.899	3 8.720	20	41.206	42.027	−16.661	8 56 24.545	1 25.366
22	22.453	23.274	−17.954	7 2 4.499	7 5.320	21	37.784	38.605	−16.614	9 0 21.170	5 21.991
23	19.000	19.821	−17.908	7 6 1.092	11 1.913	22	34.271	35.092	−16.566	9 4 17.705	9 18.526
24	15.463	16.284	−17.856	7 9 57.607	14 58.428	23	30.761	31.582	−16.518	9 8 14.243	13 15.064
25	11.989	12.810	−17.804	7 13 54.185	18 55.006	24	27.274	28.095	−16.472	9 12 10.802	17 11.623
26	8.509	9.330	−17.749	7 17 50.760	22 51.581	25	23.764	24.647	−16.438	9 16 7.326*	21 8.209*
27	4.942	5.763	−17.697	7 21 47.245	26 48.066	26	20.308	21.129	−16.412	9 20 3.896	25 4.717
28	1.500	2.321	−17.669	7 25 43.831	30 44.652	27	16.821	17.642	−16.385	9 24 0.436	29 1.257
29	57.969	58.790	−17.621	7 29 40.348	34 41.169	28	13.387	14.208	−16.360	9 27 57.027	32 57.848
30	54.486	55.307	−17.571	7 33 36.915	38 37.736	29	9.927	10.748	−16.326	9 31 53.601	36 54.422
31	50.996	51.817	−17.521	7 37 33.475	42 34.296	30	6.457	7.278	−16.276	9 35 50.181	40 51.002

NO. 14, BELLEVUE, NKF, 25 METERS, RHYTHMIC SIGNALS, $10^h 20^m$ TO $10^h 25^m$, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal	Greenwich Date	Seconds of Clock 1st Signal	Seconds of Clock 306th Signal	Clock Correction	Washington Sidereal Times 1st Signal	Washington Sidereal Times 306th Signal
Oct. 3	30.556	31.377	−18.909	5 57 11.647	2 12.468	Oct. 29	59.624	0.445	−17.621	7 39 42.003	44 42.824
5	23.508	24.329	−18.806	6 5 4.702	10 5.523	31	52.674	53.464	−17.521	7 47 35.153*	52 35.943*
7	16.570	17.391	−18.745	6 12 57.825	17 58.646	Nov. 2	45.624	46.445	−17.432	7 55 28.192	0 29.013
8	13.060	13.881	−18.712	6 16 54.348	21 55.169	3	42.213	43.034	−17.388	7 59 24.825	4 25.646
10	6.122	6.943	−18.602	6 24 47.520	29 48.341	4	38.660	39.481	−17.354	8 3 21.306	8 22.127
14	52.032	52.853	−18.365	6 40 33.667	45 34.488	12	10.794	11.615	−17.001	8 34 53.790	39 54.611
15	48.651	49.472	−18.312	6 44 30.339	49 31.160	15	0.337	1.158	−16.852	8 46 43.485	51 44.306
16	45.081	45.902	−18.260	6 48 26.821	53 27.642	16	56.876	57.697	−16.813	8 50 40.063	55 40.884
17	41.601	42.422	−18.196	6 52 23.405	57 24.226	17	53.346	54.167	−16.773	8 54 36.573	59 37.394
18	38.069	38.890	−18.144	6 56 19.925	1 20.746	19	46.361	47.182	−16.700	9 2 29.661	7 30.482
19	34.564	35.385	−18.106	7 0 16.458	5 17.279	20	42.863	43.684	−16.661	9 6 26.202	11 27.023
21	27.582	28.403	−18.008	7 8 9.574	13 10.395	22	35.908	36.729	−16.566	9 14 19.342	19 20.163
24	17.125	17.946	−17.856	7 19 59.269	25 0.090	25	25.447	26.268	−16.438	9 26 9.009	31 9.830
26	10.156	10.977	−17.749	7 27 52.407	32 53.228	26	21.941	22.762	−16.412	9 30 5.529	35 6.350
28	3.123	3.944	−17.669	7 35 45.454	40 46.275						

TABLE XVIII.—*Reception of Radio Longitude Signals at Washington*—Continued

NO. 15, BELLEVUE, NKF, 75 METERS, RHYTHMIC SIGNALS, $10^h\ 20^m$ TO $10^h\ 25^m$, G. C. T., REGISTRATION

[The times given are for the beginnings of the signals]

Greenwich Date	Seconds of Clock		Clock Correction	Washington Sidereal Times		Greenwich Date	Seconds of Clock		Clock Correction	Washington Sidereal Times	
	1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 2	33.989	34.810	−18.965	5 53 15.024	58 15.845	Oct. 30	56.127	56.948	−17.571	7 43 38.556	48 39.377
3	30.488	31.309	−18.909	5 57 11.579	2 12.400	31	52.635	53.456	−17.521	7 47 35.114	52 35.935
4	27.024	27.845	−18.853	6 1 8.171	6 8.992	Nov. 1	49.197	50.018	−17.474	7 51 31.723	56 32.544
5	23.494	24.315	−18.806	6 5 4.688	10 5.509	2	45.578	46.399	−17.432	7 55 28.146	0 28.967
7	16.545	17.366	−18.745	6 12 57.800	17 58.621	3	42.159	42.980	−17.388	7 59 24.771	4 25.592
8	13.049	13.870	−18.712	6 16 54.337	21 55.158	4	38.638	39.459	−17.354	8 3 21.284	8 22.105
9	9.537	10.358	−18.664	6 20 50.873	25 51.694	5	35.158	35.979	−17.308	8 7 17.850	12 18.671
11	2.602	3.423	−18.546	6 28 44.056	33 44.877	6	31.700	32.521	−17.257	8 11 14.443	16 15.264
12	59.097	59.918	−18.485	6 32 40.612	37 41.433	7	28.195	29.016	−17.220	8 15 10.975	20 11.796
14	51.998	52.819	−18.365	6 40 33.633	45 34.454	8	24.688	25.509	−17.172	8 19 7.516	24 8.337
15	48.654	49.475	−18.312	6 44 30.342	49 31.163	9	21.222	22.043	−17.127	8 23 4.095	28 4.916
16	45.060	45.881	−18.260	6 48 26.800	53 27.621	10	17.746	18.567	−17.081	8 27 0.665	32 1.486
17	41.583	42.404	−18.196	6 52 23.387	57 24.208	11	14.251	15.072	−17.038	8 30 57.213	35 58.034
18	38.050	38.871	−18.144	6 56 19.906	1 20.727	12	10.749	11.570	−17.004	8 34 53.745	39 54.566
19	34.520	35.341	−18.106	7 0 16.414	5 17.235	15	0.291	1.112	−16.852	8 46 43.439	51 44.260
20	31.077	31.898	−18.060	7 4 13.017	9 13.838	16	56.859	57.680	−16.813	8 50 40.046	55 40.867
21	27.558	28.379	−18.008	7 8 9.550	13 10.371	19	46.345	47.166	−16.700	9 2 29.645	7 30.466
22	24.075	24.896	−17.954	7 12 6.121	17 6.942	20	42.845	43.666	−16.661	9 6 26.184	11 27.005
23	20.614	21.435	−17.908	7 16 2.706	21 3.527	22	35.896	36.717	−16.566	9 14 19.330	19 20.151
24	17.100	17.921	−17.856	7 19 59.244	25 0.065	23	32.411	33.232	−16.518	9 18 15.893	23 16.714
25	13.609	14.430	−17.804	7 23 55.805	28 56.626	25	25.404	26.225	−16.438	9 26 8.966	31 9.787
26	10.118	10.939	−17.749	7 27 52.369	32 53.190	26	21.919	22.740	−16.412	9 30 5.507	35 6.328
27	6.550	7.371	−17.697	7 31 48.853	36 49.674	27	18.432	19.253	−16.385	9 34 2.047	39 2.868
28	3.094	3.915	−17.669	7 35 45.425	40 46.246	30	8.092	8.913	−16.276	9 45 51.816	50 52.637
29	59.588	0.409	−17.621	7 39 41.967	44 42.788						

NO. 16, HONOLULU, NPM, RHYTHMIC SIGNALS, $10^h\ 30^m$ TO $10^h\ 35^m$, G. C. T., REGISTRATION

Greenwich Date	1st Signal	306th Signal	Clock Correction	1st Signal	306th Signal	Greenwich Date	1st Signal	306th Signal	Clock Correction	1st Signal	306th Signal
Oct. 14	21.103	21.909	−18.365	6 51 2.738	56 3.544	Nov. 12	46.523	47.332	−17.004	8 45 29.519	50 30.328
17	58.289	59.096	−18.196	7 2 40.093	7 40.900	13	40.034	40.843	−16.955	8 48 23.079	53 23.888
22	20.718	21.525	−17.954	7 22 2.764	27 3.571	14	31.920	32.729	−16.900	8 53 15.020	58 15.829
28	34.887	35.694	−17.669	7 46 17.218	51 18.025	15	24.875	25.684	−16.852	8 57 8.023	2 8.832
29	27.758	28.566	−17.621	7 50 10.137	55 10.945	16	17.871	18.680	−16.813	9 1 1.058	6 1.867
30	20.660	21.468	−17.571	7 54 3.089	59 3.897	19	57.217	58.026	−16.700	9 12 40.517	17 41.326
31	13.373	14.181	−17.521	7 57 55.852	2 56.660	20	50.221	51.030	−16.661	9 16 33.560	21 34.369
Nov. 1	6.087	6.895	−17.474	8 1 48.613	6 49.421	21	43.507	44.316	−16.614	9 20 26.893	25 27.702
2	58.906	59.714	−17.432	8 5 41.474	10 42.282	23	30.193	31.002	−16.518	9 28 13.675	33 14.484
4	44.724	45.532	−17.354	8 13 27.370	18 28.178	24	22.657	23.466	−16.472	9 33 6.185	38 6.994
5	37.784	38.592	−17.308	8 17 20.476	22 21.284	25	16.540	17.349	−16.438	9 36 0.102	41 0.911
7	22.743	23.552	−17.220	8 26 5.523	31 6.332	28	54.861	55.670	−16.360	9 48 38.501	53 39.310
9	8.910	9.719	−17.127	8 32 51.783	37 52.592	29	47.803	48.612	−16.326	9 52 31.477	57 32.286
10	0.918	1.727	−17.081	8 37 43.837	42 44.646	30	40.777	41.586	−16.276	9 56 24.501	1 25.310
11	53.791	54.600	−17.038	8 41 36.753	46 37.562						

NO. 17, HONOLULU, NPM, RHYTHMIC SIGNALS, $10^h\ 40^m$ TO $10^h\ 45^m$, G. C. T., REGISTRATION

Greenwich Date	1st Signal	306th Signal	Clock Correction	1st Signal	306th Signal	Greenwich Date	1st Signal	306th Signal	Clock Correction	1st Signal	306th Signal
Oct. 3	39.507	40.312	−18.909	6 17 20.598	22 21.403	Oct. 24	56.646	57.453	−17.856	7 40 38.790	45 39.597
5	23.782	24.587	−18.806	6 25 4.976	30 5.781	29	19.580	20.388	−17.621	8 0 1.959	5 2.767
7	7.050	7.855	−18.745	6 32 48.305	37 49.110	31	5.187	5.995	−17.521	8 7 47.666	12 48.474
8	59.173	59.978	−18.712	6 36 40.461	41 41.266	Nov. 1	57.903	58.711	−17.474	8 11 40.429	16 41.237
10	43.825	44.631	−18.602	6 45 25.223	50 26.029	5	29.599	30.407	−17.308	8 27 12.291	32 13.099
11	36.887	37.693	−18.546	6 48 18.341	53 19.147 [1]	6	21.667	22.475	−17.257	8 32 4.410	37 5.218
12	28.254	29.060	−18.485	6 53 9.769	58 10.575	19	49.012	49.821	−16.700	9 22 32.312	27 33.121
14	12.897	13.703	−18.365	7 0 54.532	5 55.338	23	22.020	22.829	−16.518	9 38 5.502	43 6.311
21	19.882	20.667	−18.008	7 28 1.874*	33 2.659*	25	8.356	9.165	−16.438	9 45 51.918	50 52.727
22	12.501	13.308	−17.954	7 31 54.547	36 55.354	26	1.274	2.083	−16.412	9 49 44.862	54 45.671
23	5.033	5.840	−17.908	7 35 47.125	40 47.932	28	46.653	47.462	−16.360	9 58 30.293	3 31.102

[1] Zero assumed.

Table XVIII.—*Reception of Radio Longitude Signals at Washington*—Continued

NO. 21. ANNAPOLIS, NSS, TIME SIGNALS, $16^h\ 55^m$ TO $17^h\ 0^m$ G. C. T., REGISTRATION

[The times given are for the beginnings of the signals]

Greenwich Date	Seconds of Clock		Clock Correction	Washington Sidereal Times		Greenwich Date	Seconds of Clock		Clock Correction	Washington Sidereal Times	
	1st Signal	301st Signal		1st Signal	301st Signal		1st Signal	301st Signal		1st Signal	301st Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 2	38.893	39.714	−18.947	12 29 19.946	34 20.767	Nov. 1	54.023	54.844	−17.463	14 27 36.560	32 37.381
3	35.356	36.177	−18.893	12 33 16.463	38 17.284	2	50.508	51.329	−17.419	14 31 33.089	36 33.910
4	31.883	32.704	−18.839	12 37 13.044	42 13.865	3	47.016	47.837	−17.378	14 35 29.638	40 30.459
5	28.383	29.204	−18.799	12 41 9.584	46 10.405	4	43.537	44.358	−17.345	14 39 26.192	44 27.013
6	24.938	25.759	−18.768	12 45 6.170	50 6.991	5	40.034	40.855	−17.289	14 43 22.745	48 23.566
7	21.432	22.253	−18.737	12 49 2.695	54 3.516	6	36.544	37.365	−17.250	14 47 19.294	52 20.115
8	17.943	18.764	−18.703	12 52 59.240	58 0.061	7	33.071	33.892	−17.207	14 51 15.864	56 16.685
9	14.490	15.311	−18.647	12 56 55.843	1 56.664	8	29.587	30.408	−17.160	14 55 12.427	0 13.248
10	11.011	11.832	−18.587	13 0 52.424	5 53.245	9	26.050	26.871	−17.114	14 59 8.936	4 9.757
11	7.553	8.374	−18.529	13 4 49.024	9 49.845	10	22.628	23.449	−17.068	15 3 5.560	8 6.381
12	3.985	4.806	−18.468	13 8 45.517	13 46.338	11	19.135	19.956	−17.031	15 7 2.104	12 2.925
13	0.507	1.328	−18.408	13 12 42.099	17 42.920	12	15.625	16.446	−16.992	15 10 58.633	15 59.454
14	56.939	57.760	−18.348	13 16 38.591	21 39.412	13	12.175	12.996	−16.940	15 14 55.235	19 56.056
15	53.444	54.265	−18.301	13 20 35.143	25 35.964	14	8.654	9.475	−16.885	15 18 51.769	23 52.590
16	49.953	50.774	−18.242	13 24 31.711	29 32.532	15	5.153	5.974	−16.841	15 22 48.312	27 49.133
17	46.464	47.285	−18.178	13 28 28.286	33 29.107	16	1.672	2.493	−16.802	15 26 44.870	31 45.691
18	42.953	43.774	−18.135	13 32 24.818	37 25.639	17	58.167	58.988	−16.758	15 30 41.409	35 42.230
19	39.395	40.216	−18.092	13 36 21.303	41 22.124	18	54.638	55.459	−16.722	15 34 37.916	39 38.737
20	35.930	36.751	−18.047	13 40 17.883	45 18.704	19	51.209	52.030	−16.691	15 38 34.518	43 35.339
21	32.478	33.299	−17.990	13 44 14.488	49 15.309	20	47.718	48.539	−16.648	15 42 31.070	47 31.891
22	28.935	29.756	−17.943	13 48 10.992	53 11.813	21	44.255	45.076	−16.601	15 46 27.654	51 28.475
23	25.531	26.352	−17.894	13 52 7.637	57 8.458	22	40.810	41.631	−16.553	15 50 24.257	55 25.078
24	21.970	22.791	−17.841	13 56 4.129	1 4.950	23	37.303	38.124	−16.505	15 54 20.798	59 21.619
25	18.505	19.326	−17.789	14 0 0.716	5 1.537	24	33.800	34.621	−16.461	15 58 17.339	3 18.160
26	14.985	15.806	−17.732	14 3 57.253	8 58.074	25	30.308	31.129	−16.431	1 2 13.877	7 14.698
27	11.492	12.313	−17.692	14 7 53.800	12 54.621	26	26.809	27.630	−16.404	16 6 10.405	11 11.226
28	8.006	8.827	−17.656	14 11 50.350	16 51.171	27	23.332	24.153	−16.378	16 10 6.954	15 7.775
29	4.481	5.302	−17.607	14 15 46.874	20 47.695	28	19.876	20.697	−16.354	16 14 3.522	19 4.343
30	1.010	1.831	−17.557	14 19 43.453	24 44.274	29	16.434	17.255	−16.311	16 18 0.123	23 0.944
31	57.524	58.345	−17.507	14 23 40.017	28 40.838	30	12.938	13.759	−16.262	16 21 56.676	26 57.497

NO. 26, BORDEAUX, LY, RHYTHMIC SIGNALS, $20^h\ 1^m$ TO $20^h\ 6^m$, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock		Clock Correction	Washington Sidereal Times		Greenwich Date	Seconds of Clock		Clock Correction	Washington Sidereal Times	
	1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal		1st Signal	306th Signal
1926	s	s	s	h m s	m s	1926	s	s	s	h m s	m s
Oct. 2	9.454	10.275	−18.938	15 35 50.516	40 51.337	Nov. 1	24.658	25.479	−17.458	17 34 7.200	39 8.021
5	58.992	59.813	−18.795	15 47 40.197	52 41.018	2	21.158	21.979	−17.413	17 38 3.745	43 4.566
6	55.535	56.322	−18.764	15 51 36.771*	56 37.558*	3	17.668	18.489	−17.373	17 42 0.295	47 1.116
7	52.075	52.896	−18.733	15 55 33.342	0 34.163	4	14.181	15.002	−17.341	17 45 56.840	50 57.661
8	48.520	49.341	−18.698	15 59 29.822	4 30.643	5	10.682	11.503	−17.280	17 49 53.402	54 54.223
9	45.007	45.828	−18.638	16 3 26.369	8 27.190	6	7.156	7.977	−17.246	17 53 49.910	58 50.731
10	41.486	42.307	−18.579	16 7 22.907	12 23.728	7	3.651	4.472	−17.200	17 57 46.451	2 47.272
11	37.962	38.783	−18.520	16 11 19.442	16 20.263	8	0.126	0.947	−17.154	18 1 42.972	6 43.793
12	34.441	35.262	−18.460	16 15 15.981	20 16.802	9	56.627	57.448	−17.107	18 5 39.520	10 40.341
13	30.929	31.750	−18.400	16 19 12.529	24 13.350	10	53.138	53.959	−17.062	18 9 36.076	14 36.897
14	27.415	28.236	−18.340	16 23 9.075	28 9.896	11	49.648	50.469	−17.027	18 13 32.621	18 33.442
15	23.906	24.727	−18.295	16 27 5.611	32 6.432	12	46.181	47.002	−16.986	18 17 29.195	22 30.016
16	20.432	21.253	−18.233	16 31 2.199	36 3.020	13	42.669	43.490	−16.933	18 21 25.736	26 26.557
17	16.967	17.788	−18.169	16 34 58.798	39 59.619	14	39.172	39.965	−16.878	18 25 22.294*	30 23.087*
18	13.451	14.272	−18.130	16 38 55.321	43 56.142	15	35.686	36.507	−16.835	18 29 18.851	34 19.672
19	10.014	10.835	−18.085	16 42 51.929	47 52.750	16	32.168	32.989	−16.797	18 33 15.371	38 16.192
20	6.523	7.344	−18.041	16 46 48.482	51 49.303	17	28.765	29.586	−16.751	18 37 12.014	42 12.835
21	3.066	3.887	−17.981	16 50 45.085	55 45.906	18	25.258	26.079	−16.718	18 41 8.540	46 9.361
22	59.611	0.432	−17.937	16 54 41.674	59 42.495	19	21.837	22.658	−16.686	18 45 5.151	50 5.972
23	56.084	56.905	−17.887	16 58 38.197	3 39.018	20	18.356	19.177	−16.641	18 49 1.715	54 2.536
24	52.590	53.411	−17.834	17 2 34.756	7 35.577	21	14.878	15.699	−16.594	18 52 58.284	57 59.105
25	49.168	50.024	−17.781	17 6 31.387*	11 32.243*	23	7.954	8.741	−16.498	19 0 51.456*	5 52.243*
26	45.670	46.526	−17.724	17 10 27.946*	15 28.802*	24	4.434	5.255	−16.456	19 4 47.978	9 48.799
27	42.063	42.884	−17.690	17 14 24.373	19 25.194	25	0.936	1.757	−16.427	19 8 44.509	13 45.330
28	38.625	39.446	−17.650	17 18 20.975	23 21.796	27	53.954	54.775	−16.375	19 16 37.579	21 38.400
29	35.164	35.985	−17.600	17 22 17.564	27 18.385	28	50.455	51.276	−16.351	19 20 34.104	25 34.925
30	31.654	32.475	−17.550	17 26 14.104	31 14.925	29	46.996	47.817	−16.304	19 24 30.692	29 31.513
						30	43.499	44.320	−16.255	19 28 27.244	33 28.065

TABLE XVIII.—*Reception of Radio Longitude Signals at Washington*—Continued

NO. 28, ANNAPOLIS, NSS, RHYTHMIC SIGNALS, $20^h\ 10^m$ TO $20^h\ 15^m$, G. C. T., REGISTRATION

[The times given are for the beginnings of the signals]

Greenwich Date	Seconds of Clock: 1st Signal	Seconds of Clock: 306th Signal	Clock Correction	Washington Sidereal Times: 1st Signal	Washington Sidereal Times: 306th Signal
1926	s	s	s	h m s	m s
Oct. 2	10.932	11.753	−18.938	15 44 51.994	49 52.815
3	7.396	8.217	−18.885	15 48 48.511	53 49.332
4	3.924	4.745	−18.832	15 52 45.092	57 45.913
5	0.411	1.232	−18.795	15 56 41.616	1 42.437
6	56.963	57.784	−18.764	16 0 38.199	5 39.020
7	53.490	54.311	−18.733	16 4 34.757	9 35.578
8	50.002	50.823	−18.698	16 8 31.304	13 32.125
9	46.508	47.329	−18.638	16 12 27.870	17 28.691
10	43.017	43.838	−18.579	16 16 24.438	21 25.259
11	39.509	40.330	−18.520	16 20 20.989	25 21.810
12	36.072	36.893	−18.460	16 24 17.612	29 18.433
13	32.500	33.321	−18.400	16 28 14.100	33 14.921
14	28.981	29.802	−18.340	16 32 10.641	37 11.462
15	25.447	26.268	−18.295	16 36 7.152	41 7.973
16	21.984	22.805	−18.233	16 40 3.751	45 4.572
17	18.479	19.300	−18.169	16 44 0.310	49 1.131
18	14.967	15.810	−18.130	16 47 56.837*	52 57.680*
19	11.422	12.243	−18.085	16 51 53.337	56 54.158
20	8.020	8.841	−18.041	16 55 49.979	0 50.800
21	4.527	5.348	−17.981	16 59 46.546	4 47.367
22	1.007	1.828	−17.937	17 3 43.070	8 43.891
23	57.532	58.353	−17.887	17 7 39.645	12 40.466
24	54.012	54.833	−17.834	17 11 36.178	16 36.999
25	50.589	51.410	−17.781	17 15 32.808	20 33.629
26	46.978	47.799	−17.724	17 19 29.254	24 30.075
27	43.521	44.342	−17.690	17 23 25.831	28 26.652
28	40.066	40.887	−17.650	17 27 22.416	32 23.237
29	36.522	37.343	−17.600	17 31 18.922	36 19.743
30	33.040	33.861	−17.550	17 35 15.490	40 16.311
31	29.497	30.318	−17.500	17 39 11.997	44 12.818
1926	s	s	s	h m s	m s
Nov. 1	26.046	26.867	−17.458	17 43 8.588	48 9.409
2	22.546	23.367	−17.413	17 47 5.133	52 5.954
3	19.003	19.824	−17.373	17 51 1.630	56 2.451
4	15.576	16.397	−17.341	17 54 58.235	59 59.056
5	12.065	12.886	−17.280	17 58 54.785	3 55.606
6	8.549	9.370	−17.246	18 2 51.303	7 52.124
7	5.112	5.933	−17.200	18 6 47.912	11 48.733
8	1.625	2.446	−17.154	18 10 44.471	15 45.292
9	58.137	58.958	−17.107	18 14 41.030	19 41.851
10	54.638	55.459	−17.062	18 18 37.576	23 38.397
11	51.154	51.975	−17.027	18 22 34.127	27 34.948
12	47.628	48.449	−16.986	18 26 30.642	31 31.463
13	44.191	45.012	−16.933	18 30 27.258	35 28.079
14	40.701	41.522	−16.878	18 34 23.823	39 24.644
15	37.204	38.025	−16.835	18 38 20.369	43 21.190
16	33.655	34.476	−16.797	18 42 16.858	47 17.679
17	30.210	31.031	−16.751	18 46 13.459	51 14.280
18	26.737	27.558	−16.718	18 50 10.019	55 10.840
19	23.262	24.083	−16.686	18 54 6.576	59 7.397
20	19.817	20.638	−16.641	18 58 3.176	3 3.997
21	16.319	17.140	−16.594	19 1 59.725	7 0.546
22	12.831	13.652	−16.546	19 5 56.285	10 57.106
23	9.300	10.121	−16.498	19 9 52.802	14 53.623
24	5.862	6.683	−16.456	19 13 49.406	18 50.227
25	2.388	3.209	−16.427	19 17 45.961	22 46.782
26	58.834	59.655	−16.400	19 21 42.434	26 43.255
27	55.345	56.166	−16.375	19 25 38.970	30 39.791
28	51.905	52.726	−16.351	19 29 35.554	34 36.375
29	48.472	49.293	−16.304	19 33 32.168	38 32.989
30	45.006	45.803	−16.255	19 37 28.751*	42 29.548*

NO. 29, BELLEVUE, NKF, 25 METERS, RHYTHMIC SIGNALS, $20^h\ 20^m$ TO $20^h\ 25^m$, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock: 1st Signal	Seconds of Clock: 306th Signal	Clock Correction	Washington Sidereal Times: 1st Signal	Washington Sidereal Times: 306th Signal
Oct. 2	12.595	13.416	−18.938	15 54 53.657	59 54.478
4	5.506	6.327	−18.832	16 2 46.674	7 47.495
6	58.585	59.406	−18.764	16 10 39.821	15 40.642
7	55.140	55.961	−18.733	16 14 36.407	19 37.228
8	51.632	52.453	−18.698	16 18 32.934	23 33.755
10	44.657	45.478	−18.579	16 26 26.078	31 26.899
11	41.148	41.969	−18.520	16 30 22.628	35 23.449
15	27.096	27.917	−18.295	16 46 8.801	51 9.622
16	23.625	24.446	−18.233	16 50 5.392	55 6.213
17	20.116	20.937	−18.169	16 54 1.947	59 2.768
18	16.593	17.414	−18.130	16 57 58.463	2 59.284
21	6.134	6.955	−17.981	17 9 48.153	14 48.974
23	59.176	59.997	−17.887	17 17 41.289	22 42.110
26	48.625	49.446	−17.724	17 29 30.901	34 31.722
Oct. 27	45.147	45.968	−17.690	17 33 27.457	38 28.278
28	41.708	42.529	−17.650	17 37 24.058	42 24.879
30	34.720	35.541	−17.550	17 45 17.170	50 17.991
Nov. 1	27.718	28.539	−17.458	17 53 10.260	58 11.081
2	24.206	25.027	−17.413	17 57 6.793	2 7.614
3	20.701	21.522	−17.373	18 1 3.328	6 4.149
14	42.374	43.195	−16.878	18 44 25.496	49 26.317
16	35.316	36.137	−16.797	18 52 18.519	57 19.340
20	21.489	22.310	−16.641	19 8 4.848	13 5.669
22	14.497	15.318	−16.546	19 15 57.951	20 58.772
24	7.551	8.372	−16.456	19 23 51.095	28 51.916
26	0.511	1.332	−16.400	19 31 44.111	36 44.932
27	57.116	57.937	−16.375	19 35 40.741	40 41.562
30	46.665	47.486	−16.255	19 47 30.410	52 31.231

NO. 30, BELLEVUE, NKF, 75 METERS, RHYTHMIC SIGNALS, $20^h\ 20^m$ TO $20^h\ 25^m$, G. C. T., REGISTRATION

Greenwich Date	Seconds of Clock: 1st Signal	Seconds of Clock: 306th Signal	Clock Correction	Washington Sidereal Times: 1st Signal	Washington Sidereal Times: 306th Signal
Oct. 2	12.562	13.383	−18.938	15 54 53.624	59 54.445
3	9.023	9.844	−18.885	15 58 50.138	3 50.959
4	5.489	6.310	−18.832	16 2 46.657	7 47.478
7	55.104	55.925	−18.733	16 14 36.371	19 37.192
8	51.607	52.428	−18.698	16 18 32.909	23 33.730
9	48.131	48.952	−18.638	16 22 29.493	27 30.314
11	41.132	41.953	−18.520	16 30 22.612	35 23.433
12	37.702	38.523	−18.460	16 34 19.242	39 20.063
15	27.077	27.898	−18.295	16 46 8.782	51 9.603
16	23.613	24.434	−18.233	16 50 5.380	55 6.201
17	20.076	20.897	−18.169	16 54 1.907	59 2.728
18	16.562	17.383	−18.130	16 57 58.432	2 59.253
19	13.049	13.870	−18.085	17 1 54.964	6 55.785
20	9.614	10.435	−18.041	17 5 51.573	10 52.394
21	6.109	6.930	−17.981	17 9 48.128	14 48.949
22	2.604	3.425	−17.937	17 13 44.667	18 45.488
23	59.148	59.969	−17.887	17 17 41.261	22 42.082
25	52.162	52.983	−17.781	17 25 34.381	30 35.202
26	48.593	49.414	−17.724	17 29 30.869	34 31.690
27	45.118	45.939	−17.690	17 33 27.428	38 28.249
28	41.670	42.491	−17.650	17 37 24.020	42 24.841
29	38.144	38.965	−17.600	17 41 20.544	46 21.365
30	34.694	35.515	−17.550	17 45 17.144	50 17.965
31	31.148	31.969	−17.500	17 49 13.648	54 14.469
Nov. 1	27.689	28.510	−17.458	17 53 10.231	58 11.052
Nov. 2	24.177	24.998	−17.413	17 57 6.764	2 7.585
3	20.643	21.464	−17.373	18 1 3.270	6 4.091
4	17.225	18.046	−17.341	18 4 59.884	10 0.705
6	10.186	11.007	−17.246	18 12 52.940	17 53.761
7	6.746	7.567	−17.200	18 16 49.546	21 50.367
8	3.263	4.084	−17.154	18 20 46.109	25 46.930
9	59.798	0.619	−17.107	18 24 42.691	29 43.512
10	56.280	57.101	−17.062	18 28 39.218	33 40.039
12	49.309	50.130	−16.986	18 36 32.323	41 33.144
14	42.339	43.160	−16.878	18 44 25.461	49 26.282
15	38.846	39.667	−16.835	18 48 22.011	53 22.832
16	35.294	36.115	−16.797	18 52 18.497	57 19.318
18	28.368	29.189	−16.718	19 0 11.650	5 12.471
19	24.937	25.758	−16.686	19 4 8.251	9 9.072
20	21.476	22.297	−16.641	19 8 4.835	13 5.656
21	17.958	18.779	−16.594	19 12 1.364	17 2.185
22	14.483	15.304	−16.546	19 15 57.937	20 58.758
23	10.981	11.802	−16.498	19 19 54.483	24 55.304
24	7.527	8.348	−16.456	19 23 51.071	28 51.892
25	4.002	4.823	−16.427	19 27 47.575	32 48.396
26	0.494	1.315	−16.400	19 31 44.094	36 44.915
27	57.111	57.932	−16.375	19 35 40.736	40 41.557
28	53.541	54.362	−16.351	19 39 37.190	44 38.011
29	50.142	50.963	−16.304	19 43 33.838	48 34.659
30	46.622	47.443	−16.255	19 47 30.367	52 31.188

TABLE XIX.—*Observed Transmission Times*

SAN DIEGO–ALGIERS

Annapolis signals, No. 2, No. 4, No. 13; Bordeaux signal, No. 9

1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.
		s			s			s			s
Oct. 6	2	+0.064	Nov. 7	3	+0.050	Nov. 17	2	+0.035	Nov. 26	3	+0.087
8	3	+ .044	9	3	+ .073	18	3	+ .051	28	3	+ .074
18	3	+ .073	10	2	+ .014	19	3	+ .049	29	3	+ .069
19	2	+ .057	11	3	+ .038	20	3	+ .066	30	3	+ .023
22	3	+ .072	12	3	+ .049	22	3	+ .064	31	3	+0.098
26	3	+ .043	13	2	+ .072	23	3	+ .065			
Nov. 1	3	+ .038	14	3	+ .054	24	3	+ .075			
6	3	+0.038	15	3	+0.053	25	3	+0.037			

SAN DIEGO–PARIS

Annapolis signals, No. 2, No. 4, No. 13; Bordeaux signal, No. 9

1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.
Oct. 6	2	+0.038	Nov. 7	3	+0.057	Nov. 17	3	+0.022	Nov. 28	3	+0.073
8	3	+ .054	9	3	+ .073	18	3	+ .050	29	3	+ .065
18	3	+ .079	10	3	+ .024	19	3	+ .048	30	3	+0.029
19	3	+ .044	11	3	+ .048	20	3	+ .049			
22	2	+ .082	12	3	+ .055	22	3	+ .062			
26	3	+ .081	13	3	+ .062	23	3	+ .076			
Nov. 1	3	+ .048	14	2	+ .040	25	3	+ .045			
6	3	+0.042	15	3	+0.045	26	2	+0.068			

SAN DIEGO–WASHINGTON

Honolulu signals, No. 5, No. 16; Annapolis signals, No. 1, No. 2, No. 4, No. 13, No. 15

1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.
Oct. 14	2	+0.027	Nov. 2	2	+0.038	Nov. 13	2	+0.022	Nov. 22	3	+0.008
17	2	+ .041	4	3	+ .010	14	2	+ .029	23	3	+ .031
22	2	+ .046	5	3	+ .027	15	3	+ .026	24	2	+ .062
28	3	+ .019	7	3	+ .009	16	3	+ .008	25	3	+ .038
29	3	+ .031	9	3	+ .020	19	3	+ .045	28	2	+ .020
30	3	+ .027	10	3	+ .008	19	3	+ .039	29	2	− .023
31	3	+ .040	11	3	+ .022	20	3	+ .021	30	3	+0.037
Nov. 1	3	+0.004	12	3	+0.002	21	2	+0.044			

SAN DIEGO–WASHINGTON

Honolulu signal, No. 16; Bordeaux signal, No. 9

1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.
Oct. 22	-	+0.068	Nov. 11	-	+0.017	Nov. 19	-	+0.028	Nov. 28	-	+0.024
Nov. 1	-	+ .018	12	-	− .024	20	-	+ .030	29	-	− .026
7	-	+ .024	13	-	+ .017	23	-	+ .043	30	-	+0.019
9	-	+ .042	14	-	+ .031	24	-	+ .064			
10	-	+0.016	15	-	+0.054	25	-	+0.014			

SHANGHAI–SAN DIEGO

Saigon signal, No. 19; Honolulu signal, No. 16

1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.
Oct. 8	-	+0.032	Oct. 26	-	+0.066	Nov. 4	-	+0.054	Nov. 21	-	+0.013
13	-	+ .047	28	-	+ .018	6	-	+ .044	24	-	+ .076
14	-	+ .033	29	-	+ .029	7	-	+ .040	25	-	+ .061
19	-	+ .011	30	-	+ .022	8	-	+ .017	26	-	+0.069
20	-	+ .063	31	-	+ .070	10	-	+ .054			
22	-	+ .029	Nov. 1	-	+ .046	11	-	+ .081			
23	-	+ .043	2	-	+ .031	14	-	+ .064			
25	-	+0.032	3	-	+0.052	19	-	+0.069			

TABLE XIX.—*Observed Transmission Times*—Continued

WASHINGTON–ALGIERS

Annapolis signals, No. 2, No. 13; Bordeaux signal, No. 9

1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.
		s			s			s			s
Oct. 4	2	+0. 056	Oct. 23	2	+0. 058	Nov. 9	3	+0. 041	Nov. 22	3	+0. 047
12	2	+ . 066	26	3	+ . 013	10	2	+ . 036	23	3	+ . 049
13	2	+ . 070	27	2	+ . 005	11	2	+ . 044	24	3	+ . 052
14	2	+ . 051	28	3	+ . 065	12	3	+ . 073	25	3	+ . 069
15	2	+ . 073	30	2	+ . 075	13	2	+ . 060	26	3	+ . 047
16	2	+ . 088	31	3	+ . 064	14	3	+ . 050	28	3	+ . 062
17	3	+ . 071	Nov. 1	2	+ . 044	15	3	+ . 038	29	3	+ . 067
18	3	+ . 073	3	3	+ . 058	16	2	+ . 056	30	3	+ . 048
19	2	+ . 058	4	2	+ . 056	17	2	+ . 035	31	2	+0. 056
20	2	+ . 065	6	2	+ . 052	18	2	+ . 077			
21	2	+ . 005	7	3	+ . 041	19	3	+ . 066			
22	2	+0. 044	8	3	+0. 019	20	2	+0. 045			

WASHINGTON–ALGIERS

Annapolis signal, No. 28; Bordeaux signal, No. 26

1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.
Oct. 2	-	+0. 073	Oct. 21	-	+0. 060	Nov. 6	-	+0. 040	Nov. 20	-	+0. 059
7	-	+ . 052	22	-	+ . 065	7	-	+ . 070	21	-	+ . 060
9	-	+ . 072	25	-	+ . 025	9	-	+ . 061	23	-	+ . 082
11	-	+ . 043	26	-	+ . 060	10	-	+ . 058	24	-	+ . 050
13	-	+ . 044	27	-	+ . 050	11	-	+ . 042	25	-	+ . 020
14	-	+ . 045	28	-	+ . 042	12	-	+ . 072	27	-	+ . 059
15	-	+ . 022	30	-	+ . 062	13	-	+ . 068	28	-	+ . 033
16	-	+ . 033	Nov. 1	-	+ . 036	14	-	+ . 068	29	-	+ . 060
17	-	+ . 026	2	-	+ . 034	15	-	+ . 052	30	-	+0. 067
18	-	+ . 039	3	-	+ . 056	17	-	+ . 077			
19	-	+ . 043	4	-	+ . 055	18	-	+ . 058			
20	-	+0. 028	5	-	+0. 068	19	-	+0. 051			

WASHINGTON–GREENWICH

Annapolis signals, No. 21, No. 28; Bordeaux signal, No. 26

1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.
Oct. 2	2	+0. 047	Oct. 19	3	+0. 063	Nov. 4	2	+0. 062	Nov. 19	2	+0. 066
5	3	+ . 086	20	3	+ . 052	5	3	+ . 094	20	2	+ . 028
6	3	+ . 036	21	2	+ . 015	7	3	+ . 052	21	3	+ . 029
7	3	+ . 081	24	2	+ . 055	8	2	+ . 054	23	3	+ . 064
8	3	+ . 052	25	2	+ . 072	9	2	+ . 064	24	3	+ . 040
9	3	+ . 042	26	3	+ . 062	10	3	+ . 048	25	2	+ . 032
10	3	+ . 044	27	3	+ . 038	11	3	+ . 049	27	2	+ . 048
11	3	+ . 040	28	3	+ . 014	12	2	+ . 060	28	3	+ . 018
12	3	+ . 056	29	3	+ . 048	13	3	+ . 045	29	3	+ . 051
13	3	+ . 054	30	3	+ . 034	14	2	+ . 022	30	3	+0. 050
14	3	+ . 064	Nov. 1	3	+ . 037	15	3	+ . 058			
15	3	+ . 035	2	3	+ . 045	17	2	+ . 075			
16	3	+0. 040	3	3	+0. 058	18	2	+0. 058			

TABLE XIX.—*Observed Transmission Times*—Continued

WASHINGTON–PARIS

Annapolis signals, No. 2, No. 13; Bordeaux signal, No. 9

1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.
		s			s			s			s
Oct. 3	3	+0.040	Oct. 20	3	+0.071	Nov. 3	2	+0.075	Nov. 17	2	+0.034
4	3	+ .018	21	3	+ .014	4	3	+ .044	18	3	+ .065
6	2	+ .058	22	3	+ .061	5	2	+ .061	19	2	+ .059
10	2	+ .108	23	3	+ .051	6	3	+ .042	20	2	+ .043
11	3	+ .058	24	3	+ .081	7	3	+ .048	22	2	+ .047
12	3	+ .054	25	3	+ .051	9	3	+ .043	23	3	+ .060
13	3	+ .065	26	3	+ .052	10	3	+ .029	25	3	+ .064
14	3	+ .052	27	2	+ .060	11	2	+ .052	26	2	+ .052
15	3	+ .088	28	2	+ .059	12	3	+ .074	28	3	+ .058
16	3	+ .083	29	3	+ .041	13	3	+ .058	29	2	+ .065
17	3	+ .094	30	3	+ .058	14	2	+ .038	30	3	+0.050
18	3	+ .080	31	3	+ .063	15	3	+ .034			
19	3	+0.048	Nov. 1	3	+0.060	16	3	+0.056			

WASHINGTON–PARIS

Annapolis signal, No. 28; Bordeaux signal, No. 26

1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.	1926	Wt.	Diff.
Oct. 2	-	+0.046	Oct. 15	-	+0.021	Oct. 27	-	+0.071	Nov. 10	-	+0.070
5	-	+ .066	16	-	+ .045	28	-	+ .044	12	-	+ .066
6	-	+ .035	17	-	+ .058	29	-	+ .050	15	-	+ .070
7	-	+ .090	18	-	+ .037	30	-	+ .058	17	-	+ .088
8	-	+ .055	19	-	+ .065	Nov. 1	-	+ .042	20	-	+ .062
9	-	+ .048	20	-	+ .062	2	-	+ .067	21	-	+ .042
10	-	+ .055	21	-	+ .062	3	-	+ .092	24	-	+ .058
11	-	+ .076	22	-	+ .090	4	-	+ .053	27	-	+ .042
12	-	+ .052	23	-	+ .047	7	-	+ .068	28	-	+ .040
13	-	+ .046	25	-	+ .049	8	-	+ .057	29	-	+ .073
14	-	+0.049	26	-	+0.079	9	-	+0.075	30	-	+0.058

TABLE XX.—*Collected Results. Transmission Time and Velocity*

Longitude Stations	Radio Stations	Transmission Time	Total Distance	Transmission Velocity
		s s	*Miles*	*Miles per second*
San Diego–Algiers	Annapolis, Bordeaux	0.0565±0.0023	7,080	125,000± 5,000
San Diego–Paris	Annapolis, Bordeaux	0.0540±0.0022	6,970	129,000± 5,000
San Diego–Washington	Honolulu, Annapolis	0.0244±0.0019	4,480	184,000±14,000
San Diego–Washington	Honolulu, Bordeaux	0.0255±0.0036	4,180	164,000±23,000
Shanghai–San Diego	Saigon, Honolulu	0.0452±0.0028	8,900	197,000±12,000
Washington–Algiers	Annapolis, Bordeaux	0.0531±0.0018	7,380	139,000± 4,500
Washington–Algiers	Annapolis, Bordeaux	0.0520±0.0017	7,380	142,000± 4,500
Washington–Greenwich	Annapolis, Bordeaux	0.0496±0.0016	6,960	140,000± 4,500
Washington–Paris	Annapolis, Bordeaux	0.0562±0.0017	7,270	129,000± 4,000
Washington–Paris	Annapolis, Bordeaux	0.0586±0.0016	7,270	124,000± 3,500

TABLE XXI.—*Longitude, San Diego–Algiers*

Greenwich Date	Difference of Longitude $8^h\ 0^m\ 56^s.000+$						Wt.
	No. 28	No. 2	No. 4	No. 9	No. 13	Mean	
1926	s	s	s	s	s	s	
Oct. 1.8– 2.4	---	0.858	---	---	---	0.858	2
2.8– 3.4	---	---	---	---	---	---	-
3.8– 4.4	---	.894	0.916	---	---	.905	3
4.8– 5.4	---	.912	---	---	---	.912	2
5.8– 6.4	---	---	.906	0.880	---	.893	3
6.8– 7.4	---	.928	.924	---	---	.926	3
7.8– 8.4	0.910	.910	.923	.910	---	.913	3
8.8– 9.4 [1]	---	---	.926	---	---	.926	1
9.8–10.4	.956	---	- -	---	---	.956	2
10.8–11.4	---	.924	---	---	---	.924	2
11.8–12.4	.928	.950	.951	---	---	.943	3
12.8–13.4	---	.910	---	---	---	.910	2
13.8–14.4	.926	.929	.944	---	---	.933	3
14.8–15.4	---	.910	.914	---	---	.912	3
15.8–16.4	.867	.875	---	---	---	.871	3
16.8–17.4 [2]	.878	.862	.870	---	0.893	.876	2
17.8–18.4	.905	.935	---	.901	.938	.920	3
18.8–19.4	.910	.916	---	.897	-	.908	3
19.8–20.4	.851	.904	---	---	---	.878	3
20.8–21.4 [2]	.902	.864	---	---	---	.883	2
21.8–22.4	.855	.884	.891	.854	---	.871	3
22.8–23.4 [1]	.838	.876	.852	---	---	.855	2
23.8–24.4 [1]	---	---	---	---	---	---	-
24.8–25.4 [1]	---	---	---	---	.925	.925	1
25.8–26.4	.923	.916	---	0.914	.922	.919	3
26.8–27.4	.907	.879	---	---	---	.893	3
27.8–28.4	.880	.871	.846	---	.892	.872	3
28.8–29.4 [2]	0.824	.884	0.870	---	---	.859	2
29.8–30.4 [2]	---	---	---	---	.886	.886	1
30.8–31.4 [2]	---	0.894	---	---	0.925	0.910	2

Greenwich Date	Difference of Longitude $8^h\ 0^m\ 56^s.000+$						Wt.
	No. 28	No. 2	No. 4	No. 9	No. 13	Mean	
1926	s	s	s	s	s	s	
Nov. 0.8– 1.4 [2]	0.913	0.890	0.886	0.888	---	0.894	2
1.8– 2.4	.886	.914	---	---	---	.900	3
2.8– 3.4	.919	.942	.917	---	0.908	.922	3
3.8– 4.4 [1]	.902	.932	.891	---	---	.908	2
4.8– 5.4 [2]	.931	.909	---	---	---	.920	2
5.8– 6.4	.850	.880	.859	.870	---	.865	3
6.8– 7.4	.895	.927	.919	.904	.903	.910	3
7.8– 8.4	.931	.821	.854	---	.875	.870	3
8.8– 9.4	---	.892	.885	.849	.869	.874	3
9.8–10.4	.906	.890	---	.914	---	.903	3
10.8–11.4	.926	---	.904	.902	.900	.908	3
11.8–12.4	.919	.943	.926	.925	.938	.930	3
12.8–13.4	.944	.902	---	.868	---	.905	3
13.8–14.4	.922	.894	.914	.890	.910	.906	3
14.8–15.4 [2]	.910	.940	.932	.920	.934	.927	2
15.8–16.4 [2]	.926	.915	.900	---	---	.914	2
16.8–17.4 [2]	---	.931	---	.934	---	.932	2
17.8–18.4	.961	.926	.920	.910	---	.929	3
18.8–19.4	.929	.936	.952	.924	.918	.932	3
19.8–20.4	.910	---	.932	.889	.902	.908	3
20.8–21.4	.918	.910	.895	---	.916	.910	3
21.8–22.4	.882	.896	.886	.858	.870	.878	3
22.8–23.4 [1]	.875	.869	---	.851	.886	.870	2
23.8–24.4 [2]	---	.888	.884	.850	.890	.878	2
24.8–25.4	.885	.892	.884	.890	.892	.889	3
25.8–26.4	.888	.890	.894	.829	.850	..870	3
26.8–27.4 [1]	.890	.891	.880	---	.896	.889	2
27.8–28.4	.904	.923	.906	.874	.902	.902	3
28.8–29.4	.910	.910	---	.884	.920	.906	3
29.8–30.4	.914	.916	.912	.930	0.918	.918	3
30.8–31.4	0.922	0.930	0.935	0.872	---	0.915	3

[1] No star observations at San Diego.

[2] No star observations at Algiers.

		h	m	s
Mean longitude, by signals	No. 28, Annapolis	8	0	56. 903
	No. 2, Annapolis			56. 904
	No. 4, Bellevue			56. 903
	No. 9, Bordeaux			56. 889
	No. 13, Annapolis			56. 903
	All	8	0	56. 901
Mean longitude, by radio sending stations	Annapolis and Bellevue	8	0	56. 903
	Bordeaux			56. 889
	Mean	8	0	56. 896
Weighted mean longitude, by dates	October	8	0	56. 901
	November			56. 903
	All	8	0	56. 902 ± 0.0020 s

TABLE XXI.—*Longitude, Algiers–Shanghai*

Greenwich Date	Difference of Longitude $7^h\ 53^m\ 34^s.000+$				Wt.	Greenwich Date	Difference of Longitude $7^h\ 53^m\ 34^s.000+$				Wt.
	No. 9	No. 20	No. 26	Mean			No. 9	No. 20	No. 26	Mean	
1926	s	s	s	s		1926	s	s	s	s	
Oct. 1	---	---	(0. 271)	(0. 271)	-	Nov. 1 [1, 2]	---	---	0. 355	0. 355	1
2	---	---	. 312	. 312	2	2	---	---	. 367	. 367	2
3	---	---	---	---		3	0. 372	---	---	. 372	2
4 [1]	---	---	. 308	. 308	1	4	---	---	. 353	. 353	2
5 [1]	0. 317	---	. 285	. 301	2	5 [2]	---	---	. 369	. 369	1
6 [1]	---	---	. 325	. 325	1	6	---	---	. 357	. 357	2
7 [1]	---	---	. 379	. 379	1	7	---	---	. 343	. 343	2
8	---	0. 358	. 351	. 354	3	8	---	---	. 355	. 355	2
9 [1]	---	---	. 337	. 337	1	9	. 375	---	. 343	. 359	3
10 [1]	---	. 352	. 348	. 350	2	10	---	---	. 365	. 365	2
11	---	---	. 349	. 349	2	11	---	---	. 383	. 383	2
12	. 333	0. 321	. 326	. 327	3	12 [1]	---	---	. 377	. 377	1
13	. 361	---	. 327	. 344	3	13 [1]	---	---	. 374	. 374	1
14 [1]	---	---	. 311	. 311	1	14 [1]	---	---	. 375	. 375	1
15 [1]	. 335	---	. 321	. 328	2	15 [1, 2]	---	---	. 351	. 351	1
16	. 333	---	. 343	. 338	3	16 [1, 2]	. 377	---	. 367	. 372	1
17 [2]	. 348	---	. 367	. 358	2	17 [1, 2]	. 395	---	. 332	. 364	1
18	. 355	---	. 323	. 339	3	18	---	---	. 337	. 337	2
19	0. 370	---	. 372	. 371	3	19	---	---	. 368	. 368	2
20	---	---	. 379	. 379	2	20	---	---	. 387	. 387	2
21 [2]	---	---	. 431	. 431	1	21 [1]	---	---	. 413	. 413	1
22	---	---	. 383	. 383	2	22	---	---	. 421	. 421	2
23	---	---	---	---	-	23	---	---	. 400	. 400	2
24	---	---	. 415	. 415	2	24 [1, 2]	---	---	. 407	. 407	1
25	---	---	. 385	. 385	2	25 [1]	---	---	. 381	. 381	1
26 [1]	---	---	. 403	. 403	1	26	---	---	. 417	. 417	2
27	---	---	. 415	. 415	2	27 [1]	---	---	. 403	. 403	1
28	---	---	. 399	. 399	2	28 [1]	. 413	---	. 431	. 422	2
29 [2]	---	---	---	---	-	29	---	---	. 298	. 298	2
30 [2]	---	---	0. 387	0. 387	1	30 [1]	(0. 464)	---	(0. 459)	(0. 462)	-
31 [2]	---	---	-	---	-						

[1] No star observations at Shanghai.

[2] No star observations at Algiers.

		h	m	s
Mean longitude, by signals	No. 9, Bordeaux	7	53	34. 360
	No. 20, Nauen			34. 344
	No. 26, Bordeaux			34. 365
	All	7	53	34. 363
Mean longitude, by radio sending stations	Bordeaux	7	53	34. 364
	Nauen (few obs.)			34. 344
	Mean	7	53	34. 354
Weighted mean longitude, by dates	October	7	53	34. 354
	November			34. 376
	All	7	53	34. 365 ± 0. 0029 s

TABLE XXI.—*Longitude, Shanghai–San Diego*

Greenwich Date	Difference of Longitude $8^h\ 5^m\ 28^s.000+$				Wt.	Greenwich Date	Difference of Longitude $8^h\ 5^m\ 28^s.000+$				Wt.
	No. 9	No. 16	No. 19	Mean			No. 9	No. 16	No. 19	Mean	
1926	s	s	s	s		1926	s	s	s	s	
Oct. 2	---	---	0. 781	0. 781	2	Nov. 1 [1]	---	0. 751	0. 749	0. 750	2
3	---	---	(. 874)	(. 874)	-	2	---	. 737	. 733	. 735	3
4 [1]	---	---	. 827	. 827	1	3	---	. 731	. 735	. 733	3
5 [1]	---	---	. 803	. 803	1	4 [2]	---	. 706	. 712	. 709	2
6 [1]	---	---	. 769	. 769	1	5	---	---	. 709	. 709	2
7 [1]	---	---	. 729	. 729	1	6	---	. 738	. 734	. 736	3
8	---	0. 733	. 717	. 725	3	7	---	. 735	. 727	. 731	3
9 [1, 2]	---	---	. 749	. 749	1	8	---	. 782	. 751	. 766	3
10 [1]	---	---	. 724	. 724	1	9	0. 779	---	. 749	. 764	3
11	---	---	. 747	. 747	2	10	---	. 739	. 745	. 742	3
12	---	---	. 743	. 743	2	11	---	. 697	. 730	. 714	3
13	---	. 750	. 749	. 750	3	12 [1]	---	---	. 703	. 703	1
14 [1]	---	. 789	. 774	. 782	2	13 [1]	---	---	. 745	. 745	1
15 [1]	---	---	. 817	. 817	1	14 [1]	---	. 713	. 729	. 721	2
16	---	---	. 784	. 784	2	15 [1]	---	. 691	---	. 691	1
17	---	---	---	---	-	16 [1]	---	---	. 722	. 722	1
18	0. 745	---	. 743	. 744	3	17 [1]	. 671	---	. 741	. 706	2
19	0. 735	. 776	. 739	. 750	3	18	---	---	. 737	. 737	2
20	---	. 687	. 702	. 694	3	19	---	. 722	. 743	. 732	3
21	---	---	. 709	. 709	2	20	---	---	. 745	. 745	2
22	---	. 739	. 720	. 730	3	21 [1]	---	. 714	. 679	. 696	2
23 [2]	---	. 731	. 726	. 728	2	22	---	---	. 687	. 687	2
24 [2]	---	---	. 696	. 696	1	23 [2]	---	---	. 705	. 705	1
25 [2]	---	. 696	. 680	. 688	2	24 [1]	---	. 706	. 734	. 720	2
26 [1]	---	. 663	. 681	. 672	2	25 [1]	---	. 700	. 713	. 706	2
27	---	. 719	---	. 719	2	26	---	. 707	0. 728	. 718	3
28	---	. 739	. 709	. 724	3	27 [1, 2]	---	---	---	---	-
29	---	. 754	. 735	. 744	3	28 [1]	. 713	---	---	. 713	1
30	---	. 737	. 711	. 724	3	29	---	---	---	---	
31	---	0. 689	0. 711	0. 700	3	30 [1]	(0. 607)	(0. 601)	---	(0. 604)	-

[1] No star observations at Shanghai. [2] No star observations at San Diego.

		h	m	s
Mean longitude, by signals	No. 9, Bordeaux	8	5	28. 729
	No. 16, Honolulu			28. 726
	No. 19, Saigon			28. 734
	All	8	5	28. 731
Weighted mean longitude, by dates	October	8	5	28. 740
	November			28. 723
	All	8	5	28. 731 ± 0. 0025 s

TABLE XXI.—*Longitude, San Diego–Greenwich*

Greenwich Date	Difference of Longitude $7^h\ 48^m\ 48^s.000+$			Wt.	Greenwich Date	Difference of Longitude $7^h\ 48^m\ 48^s.000+$			Wt.
	No. 13	No. 28	Mean			No. 13	No. 28	Mean	
1926	s	s	s		1926	s	s	s	
Oct. 2	0. 350	---	0. 350	2	Nov. 1	0. 350	0. 358	0. 354	3
3 [1]	---	---	---	-	2	. 386	. 372	. 379	3
4 [1]	. 374	---	. 374	1	3 [1]	. 346	. 356	. 351	2
5 [1]	---	0. 445	. 445	1	4 [2]	. 362	. 390	. 376	2
6	---	---	---	-	5	. 348	. 272	. 310	3
7	. 424	. 416	. 420	3	6 [1]	. 330	---	. 330	1
8 [1]	. 382	. 385	. 384	2	7	---	. 377	. 377	2
9 [2]	. 358	. 384	. 371	2	8 [1]	. 316	. 342	. 329	2
10	---	---	---	-	9	. 342	. 370	. 356	3
11 [1]	. 374	. 412	. 393	2	10	. 386	. 419	. 402	3
12 [1]	. 398	. 403	. 400	2	11 [1]	. 394	. 426	. 410	2
13 [1]	---	. 406	. 406	1	12	. 406	. 414	. 410	3
14 [1]	---	---	---	-	13 [1]	. 376	. 404	. 390	2
15 [1]	. 404	. 350	. 377	2	14	---	---	---	-
16 [1]	. 360	. 366	. 363	2	15 [1]	. 380	. 380	. 380	2
17	---	. 376	. 376	2	16 [1]	. 364	---	. 364	1
18	. 392	. 372	. 382	3	17 [1]	. 372	. 426	. 399	2
19	. 354	. 342	. 348	3	18 [1]	. 380	---	. 380	1
20	. 374	. 396	. 385	3	19	. 406	. 386	. 396	3
21	. 388	---	. 388	2	20	---	. 376	. 376	2
22 [1]	---	. 352	. 352	1	21	---	. 358	. 358	2
23 [2]	. 368	. 388	. 378	2	22 [1]	. 366	. 364	. 365	2
24 [1, 2]	---	---	---	-	23 [1, 2]	. 358	---	. 358	1
25 [1, 2]	. 388	---	. 388	1	24 [1]	---	. 358	. 358	1
26	. 402	. 384	. 393	3	25 [1]	. 352	. 364	. 358	2
27	. 390	. 372	. 381	3	26	---	---	---	-
28 [1]	. 384	. 328	. 356	2	27 [2]	---	. 374	. 374	2
29 [1]	. 382	0. 348	. 365	2	28	---	. 362	. 362	2
30 [1]	0. 374	---	0. 374	1	29 [1]	. 338	. 354	. 346	2
31	---	---	---	-	30 [1]	0. 356	0. 334	0. 345	2

[1] No star observations at Greenwich.

[2] No star observations at San Diego.

		h	m	s
Mean longitude, by signals	No. 13, Annapolis	7	48	48. 372
	No. 28, Annapolis			48. 376
	All	7	48	48. 374
Weighted mean longitude, by dates	October	7	48	48. 381
	November			48. 369
	All	7	48	48. 374±0. 0022

Table XXI.—*Longitude, San Diego–Paris*

Greenwich Date	Difference of Longitude $7^h 58^m 9^s.000+$						Wt.
	No. 28	No. 2	No. 4	No. 9	No. 13	Mean	
1926	s	s	s	s	s	s	
Oct. 1.8- 2.4	---	0.229	---	---	0.243	0.236	3
2.8- 3.4 [1]	---	.209	---	---	.267	.238	2
3.8- 4.4	0.260	.247	0.265	---	.251	.256	3
4.8- 5.4	---	.291	---	---	---	.291	2
5.8- 6.4	.317	.289	---	0.288	---	.298	3
6.8- 7.4	---	.319	.283	---	---	.301	3
7.8- 8.4	.327	.299	.307	.289	.313	.307	3
8.8- 9.4 [1, 2]	.301	.282	.299	---	.291	.293	1
9.8-10.4	.318	.369	---	---	---	.343	3
10.8-11.4	---	.303	---	---	.315	.309	3
11.8-12.4 [1]	.362	.343	.346	---	.335	.347	2
12.8-13.4	.337	.283	---	---	---	.310	3
13.8-14.4 [1]	.315	.324	.317	---	---	.319	2
14.8-15.4	---	.313	.315	---	.337	.322	3
15.8-16.4 [1]	.262	.265	---	---	.272	.266	2
16.8-17.4 [1]	.280	.271	---	---	.303	.285	2
17.8-18.4	.309	.325	---	.286	.331	.313	3
18.8-19.4	.279	.277	---	.279	.295	.283	3
19.8-20.4	.255	.293	---	---	.281	.276	3
20.8-21.4 [1]	.311	.274	---	---	.297	.294	2
21.8-22.4 [1]	.295	.293	---	.248	---	.279	2
22.8-23.4 [1, 2]	.251	.269	---	---	.265	.262	1
23.8-24.4 [2]	.285	.275	0.289	---	.299	.287	2
24.8-25.4 [2]	---	.281	---	---	.286	.283	2
25.8-26.4	.285	.302	---	0.260	.306	.288	3
26.8-27.4	.295	---	---	---	.275	.285	3
27.8-28.4 [1]	.273	---	---	---	.255	.264	2
28.8-29.4 [1]	.199	.227	---	---	.243	.223	2
29.8-30.4 [1]	0.233	.261	---	---	.265	.253	2
30.8-31.4 [1]	---	0.269	---	---	0.301	0.285	2

Greenwich Date	Difference of Longitude $7^h 58^m 9^s.000+$						Wt.
	No. 28	No. 2	No. 4	No. 9	No. 13	Mean	
1926	s	s	s	s	s	s	
Nov. 0.8- 1.4	---	0.283	0.260	0.260	0.271	0.269	3
1.8- 2.4 [1]	0.258	.295	---	---	.281	.278	2
2.8- 3.4 [1]	.317	.326	.284	---	---	.309	2
3.8- 4.4 [2]	.300	.303	---	---	.307	.303	2
4.8- 5.4	.311	.316	---	---	---	.313	3
5.8- 6.4 [1]	---	.283	---	.284	.296	.288	2
6.8- 7.4	---	.332	.328	.308	.323	.323	3
7.8- 8.4	.325	---	---	---	---	.325	2
8.8- 9.4	.302	.309	.305	.270	.303	.298	3
9.8-10.4	.313	.291	---	.320	.323	.312	3
10.8-11.4	.330	.307	.314	.300	---	.313	3
11.8-12.4	---	.345	---	.316	.323	.328	3
12.8-13.4	.333	.306	---	.276	.295	.303	3
13.8-14.4	---	---	---	.296	.299	.297	3
14.8-15.4	---	.285	.280	.284	.310	.290	3
15.8-16.4 [1]	.305	.281	---	---	.303	.296	2
16.8-17.4 [1]	---	.324	.297	.326	---	.316	2
17.8-18.4 [1]	.353	.309	---	.304	.325	.323	2
18.8-19.4 [1]	---	---	.341	.314	.309	.321	2
19.8-20.4	---	---	.309	.297	.309	.305	3
20.8-21.4	.325	---	---	---	.335	.330	3
21.8-22.4	.283	---	.303	.270	.288	.286	3
22.8-23.4 [1, 2]	.283	.283	---	.248	.291	.276	1
23.8-24.4 [1]	---	---	---	.216	---	.216	1
24.8-25.4 [1]	.253	.266	.250	.254	.269	.258	-
25.8-26.4 [1]	---	---	---	.208	.239	.223	-
26.8-27.4 [1, 2]	.242	.268	.261	---	.272	.261	-
27.8-28.4 [1]	.254	.273	.280	.242	.282	.266	-
28.8-29.4 [1]	.273	---	0.286	.255	.280	.273	-
29.8-30.4 [1]	.287	0.269	---	0.283	.280	.280	-
30.8-31.4 [1]	0.259	---	---	---	---	0.259	-

[1] No star observations at Paris.

[2] No star observations at San Diego.

		h	m	s
Mean longitude, by signals	No. 28, Annapolis	7	58	9.297
	No. 2, Annapolis			9.292
	No. 4, Bellevue			9.302
	No. 9, Bordeaux			9.284
	No. 13, Annapolis			9.296
	All	7	58	9.294
Mean longitude, by radio sending stations	Annapolis and Bellevue	7	58	9.296
	Bordeaux			9.284
	Mean	7	58	9.290
Weighted mean longitude, by dates	October	7	58	9.288
	November			9.304
	All	7	58	$9.295 \pm 0^s.0024$

TABLE XXI.—*Longitude, San Diego–Washington*

Greenwich Date	Difference of Longitude $2^h\ 40^m\ 32^s.000+$										Wt.
	No. 28	No. 1	No. 2	No. 4	No. 5	No. 9	No. 13	No. 15	No. 16	Mean	
1926	s	s	s	s	s	s	s	s	s	s	
Oct. 1.8– 2.4 [1]	---	0. 535	0. 543	---	---	---	0. 551	0. 557	---	0. 546	2
2.8– 3.4	---	. 556	. 556	0. 572	---	---	. 583	---	---	. 567	3
3.8– 4.4	0. 595	. 601	. 602	---	---	---	. 611	. 624	---	. 607	3
4.8– 5.4	---	---	. 634	---	---	---	---	. 660	---	. 647	3
5.8– 6.4	. 649	. 613	. 636	. 632	---	0. 655	---	---	---	. 637	3
6.8– 7.4	---	---	. 652	. 662	---	---	. 650	. 641	---	. 651	3
7.8– 8.4	. 657	. 648	. 624	. 646	---	---	. 638	. 634	---	. 641	3
8.8– 9.4 [2]	. 613	. 588	. 598	. 614	---	---	. 606	. 618	---	. 606	2
9.8–10.4	. 627	. 607	. 644	---	---	---	. 616	---	---	. 624	3
10.8–11.4	---	. 600	. 603	---	---	---	. 601	. 617	---	. 605	3
11.8–12.4 [1]	. 638	. 642	. 626	. 647	---	---	. 634	. 617	---	. 634	2
12.8–13.4 [1]	. 618	. 606	. 586	---	---	---	---	---	---	. 603	2
13.8–14.4 [1]	. 624	. 634	. 628	. 621	---	---	---	. 633	0. 636	. 629	2
14.8–15.4	---	. 633	. 633	. 640	---	---	. 633	. 631	---	. 634	3
15.8–16.4	. 594	. 587	. 585	---	---	---	. 601	---	---	. 592	3
16.8–17.4 [1]	. 623	. 648	. 596	. 606	---	---	. 645	---	. 662	. 630	2
17.8–18.4	. 660	. 648	. 668	---	---	. 669	. 671	---	---	. 663	3
18.8–19.4	. 627	. 598	. 620	. 600	---	. 620	. 614	. 598	---	. 611	3
19.8–20.4	. 566	. 647	. 631	---	---	---	. 612	. 660	---	. 623	3
20.8–21.4	. 636	. 603	. 621	. 593	---	---	. 645	. 628	---	. 621	3
21.8–22.4	. 627	. 614	. 628	. 651	---	. 604	---	. 627	. 649	. 629	3
22.8–23.4 [2]	. 575	. 605	. 590	---	---	---	. 599	. 597	---	. 593	2
23.8–24.4 [1,2]	. 617	. 586	. 621	. 626	---	---	. 607	. 617	---	. 612	1
24.8–25.4 [1,2]	---	. 617	. 618	. 621	---	---	. 638	. 630	---	. 625	1
25.8–26.4	. 649	. 654	. 638	---	---	0. 623	. 669	---	---	. 647	3
26.8–27.4	. 645	. 637	. 660	---	---	---	. 653	. 615	---	. 642	3
27.8–28.4	. 630	. 621	. 629	. 600	---	---	. 639	. 608	. 619	. 621	3
28.8–29.4	. 562	. 629	. 607	. 609	---	---	. 624	. 606	. 622	. 608	3
29.8–30.4 [1]	0. 613	. 648	. 614	---	---	---	. 619	. 636	. 631	. 627	2
30.8–31.4 [1]	---	0. 622	0. 625	0. 617	---	---	0. 658	0. 674	0. 682	0. 646	2

[1] No star observations at Washington.

[2] No star observations at San Diego.

		h	m	October s
Mean longitude, by signals	No. 28, Annapolis	2	40	32. 621
	No. 1, Annapolis			32. 615
	No. 2, Annapolis			32. 617
	No. 4, Bellevue			32. 621
	No. 5, Honolulu			------
	No. 9, Bordeaux			32. 634
	No. 13, Annapolis			32. 625
	No. 15, Bellevue			32. 624
	No. 16, Honolulu			32. 643
	All	2	40	32. 622
Mean longitude, by radio sending stations	Annapolis and Bellevue	2	40	32. 619
	Bordeaux			32. 634
	Honolulu			32. 643
	Mean	2	40	32. 632
Weighted mean longitude, by observers at San Diego	Littell	2	40	32. 621
	Hammond			32. 622
Weighted mean longitude, by dates		2	40	32. 622

TABLE XXI.—*Longitude, San Diego–Washington*—Continued

Greenwich Date	Difference of Longitude $2^h\ 40^m\ 32^s.000+$										Wt.
	No. 28	No. 1	No. 2	No. 4	No. 5	No. 9	No. 13	No. 15	No. 16	Mean	
1926	s	s	s	s	s	s	s	s	s	s	
Nov. 0.8–1.4	0. 632	0. 653	0. 624	0. 645	---	0. 627	0. 621	0. 662	0. 622	0. 636	3
1.8–2.4	. 613	. 622	. 626	---	---	---	. 618	---	. 632	. 622	3
2.8–3.4	. 639	. 617	. 631	. 624	---	---	. 616	. 629	---	. 626	3
3.8–4.4 [1]	. 590	. 622	. 625	. 630	---	---	. 626	. 660	. 629	. 626	2
4.8–5.4	. 611	. 624	. 613	. 624	---	---	. 627	. 631	. 632	. 623	3
5.8–6.4	. 555	. 614	. 598	. 601	---	. 601	. 607	. 623	---	. 600	3
6.8–7.4	. 609	. 622	. 626	. 641	---	. 612	. 616	. 639	. 613	. 622	3
7.8–8.4	. 620	. 583	. 567	. 597	---	---	. 579	. 573	---	. 586	3
8.8–9.4 [2]	. 592	. 594	. 608	. 615	---	. 567	. 588	. 591	. 586	. 593	2
9.8–10.4 [2]	. 605	. 644	. 619	---	---	. 640	. 655	. 643	. 633	. 634	2
10.8–11.4	. 646	. 649	. 639	. 654	---	. 646	. 638	. 646	. 640	. 645	3
11.8–12.4	. 647	. 670	. 673	. 677	---	. 677	. 644	. 661	. 630	. 660	3
12.8–13.4	. 651	. 645	. 638	---	---	. 624	. 620	---	. 618	. 633	3
13.8–14.4 [2]	. 641	. 644	. 639	---	---	. 639	. 642	---	. 647	. 642	2
14.8–15.4	. 634	. 647	. 638	. 652	---	. 622	. 644	. 658	. 653	. 644	3
15.8–16.4 [2]	. 642	. 624	. 616	. 600	---	---	. 625	. 648	. 620	. 625	2
16.8–17.4	. 620	. 647	. 631	. 626	---	. 629	. 622	---	---	. 629	3
17.8–18.4	. 666	. 646	. 627	. 651	---	. 649	. 643	---	---	. 647	3
18.8–19.4	. 610	. 643	. 628	. 655	0. 662	. 640	. 614	. 647	. 645	. 638	3
19.8–20.4	. 625	---	---	. 657	---	. 615	. 622	. 628	. 622	. 628	3
20.8–21.4 [2]	. 632	. 610	. 654	. 621	---	---	. 639	---	. 659	. 636	2
21.8–22.4 [2]	. 596	. 649	. 639	. 640	0. 626	. 615	. 624	. 633	---	. 628	2
22.8–23.4 [1]	. 614	. 616	. 614	---	---	. 591	. 601	. 608	. 611	. 608	2
23.8–24.4	---	. 622	. 648	. 631	---	. 598	. 601	---	. 639	. 623	3
24.8–25.4	. 616	. 636	. 618	. 639	---	. 661	. 649	. 627	. 652	. 637	3
25.8–26.4 [2]	. 650	. 625	. 629	. 630	---	. 581	. 598	. 575	---	. 613	2
26.8–27.4 [1 2]	. 602	. 613	. 614	. 605	---	---	. 640	. 628	---	. 617	1
27.8–28.4	. 628	. 664	. 652	. 641	---	. 625	. 630	---	. 626	. 638	3
28.8–29.4	. 619	. 618	. 626	. 620	---	. 620	. 618	---	. 571	. 613	3
29.8–30.4 [2]	. 606	. 618	. 599	. 598	---	. 624	0. 608	0. 606	0. 620	. 610	2
30.8–31.4	0. 590	0. 613	0. 620	0. 626	---	0. 579	---	---	---	0. 606	3

[1] No star observations at San Diego. [2] No star observations at Washington.

		h	m	November	October and November
				s	s
Mean longitude, by signals	No. 28, Annapolis	2	40	32. 620	32. 620
	No. 1, Annapolis			32. 630	32. 623
	No. 2, Annapolis			32. 626	32. 622
	No. 4, Bellevue			32. 631	32. 627
	No. 5, Honolulu			32. 644	32. 644 [1]
	No. 9, Bordeaux			32. 621	32. 623
	No. 13, Annapolis			32. 622	32. 623
	No. 15, Bellevue			32. 629	32. 627
	No. 16, Honolulu			32. 627	32. 631
	All	2	40	32. 626	32. 624
Mean longitude, by radio sending stations	Annapolis and Bellevue	2	40	32. 626	32. 623
	Bordeaux			32. 621	32. 623
	Honolulu			32. 629	32. 632
	Mean	2	40	32. 625	32. 626
Weighted mean longitude, by observers at San Diego	Littell	2	40	32. 628	32. 625
	Hammond			32. 624	32. 623
Weighted mean longitude, by dates		2	40	32. 626	$32.624\pm0^s.0018$

[1] Two obs. only.

TABLE XXI.—*Longitude, Washington–Greenwich*

Greenwich Date	Difference of Longitude 5^h 8^m $15^s.000+$					Wt.	Greenwich Date	Difference of Longitude 5^h 8^m $15^s.000+$					Wt.
	No. 13	No. 21	No. 26	No. 28	Mean			No. 13	No. 21	No. 26	No. 28	Mean	
1926	s	s	s	s	s		1926	s	s	s	s	s	
Oct. 2[2]	0.798	0.793	0.784	---	0.792	2	Nov. 1	0.728	0.728	0.738	0.746	0.735	3
3[1]	---	.782	---	---	.782	1	2	.768	.750	.734	.732	.746	3
4[1]	.764	.768	---	0.798	.777	2	3[1]	.730	.734	.730	.766	.740	2
5[1]	.784	.761	.730	.796	.768	2	4	.736	---	.742	.766	.748	3
6	---	.763	.768	.770	.767	3	5	.720	.805	.704	.716	.736	3
7	.774	.768	.720	.758	.755	3	6[1]	.722	---	.724	---	.723	2
8[1]	.744	.765	.754	.772	.759	2	7	---	.735	.732	.756	.741	3
9	.752	.762	.756	.758	.757	3	8[1]	.738	---	.734	.750	.741	2
10	---	.759	.764	.780	.768	3	9[2]	.754	---	.738	.764	.752	2
11[1]	.772	.754	.762	.774	.766	2	10[2]	.730	.742	.748	.773	.748	2
12[1 2]	.764	.802	.776	.786	.782	1	11[1]	.756	.774	.766	.780	.769	2
13[1 2]	.790	.777	.764	.782	.778	1	12	.762	---	.740	.762	.755	3
14[1 2]	.790	.770	.750	.782	.773	1	13[1]	.756	.740	.744	.762	.750	2
15[1]	.772	.742	.752	.756	.756	2	14[2]	---	.708	.724	---	.716	2
16[1]	.758	.766	.752	.742	.754	2	15[1]	.736	.756	.727	.738	.739	2
17[2]	---	.713	---	.716	.714	2	16[1 2]	.740	---	.760	---	.750	1
18	.722	.750	---	.746	.739	3	17[1]	.750	---	.724	.761	.745	2
19	.740	.758	.742	.776	.754	3	18[1]	.738	.770	.750	---	.753	2
20	.762	.773	.752	.760	.762	3	19	.792	---	.734	.762	.763	3
21	.742	.739	.762	---	.748	3	20	---	---	.754	.744	.749	3
22[1]	.768	.784	---	.778	.777	2	21[2]	---	.756	.768	.762	.762	2
23	.768	.750	---	.770	.763	3	22[1 2]	.742	.752	---	.750	.748	1
24[1 2]	---	.777	.760	---	.768	1	23[1]	.756	.770	.740	.762	.757	2
25[1 2]	.750	.763	.729	---	.747	1	24[1]	---	.733	.736	.742	.737	2
26	.732	.745	.718	.738	.733	3	25[1]	.740	---	.720	.714	.725	2
27	.738	.745	.744	.742	.742	3	26[2]	---	---	---	---	---	-
28[1]	.744	.779	.796	.766	.771	2	27[2]	---	---	.736	.746	.741	2
29[1]	.758	.783	.750	.736	.757	2	28	---	.742	.762	.742	.749	3
30[1 2]	0.754	.748	0.764	0.772	.760	1	29[1]	.720	.730	.726	.748	.731	2
31[2]	---	0.732	---	---	0.732	1	30[1 2]	0.748	0.748	0.734	0.744	0.744	1

[1] No star observations at Greenwich. [2] No star observations at Washington.

		h	m	s
Mean longitude, by signals	No. 13, Annapolis	5	8	15.752
	No. 21, Annapolis			15.757
	No. 26, Bordeaux			15.745
	No. 28, Annapolis			15.758
	All	5	8	15.753
Mean longitude, by radio sending stations	Annapolis	5	8	15.756
	Bordeaux			15.745
	Mean	5	8	15.750
Weighted mean longitude, by dates	October	5	8	15.758
	November			15.745
	All	5	8	15.751 ± 0.0013 s

TABLE XXI.—*Longitude, Washington–Paris*

Greenwich Date	Difference of Longitude 5h 17m 36s.000+							Wt.
	No. 2	No. 4	No. 9	No. 13	No. 26	No. 28	Mean	
1926	s	s	s	s	s	s	s	
Oct. 2[1]	0.685	---	---	0.691	0.681	0.689	0.687	2
3[2]	.641	---	0.661	.685	---	.665	.663	2
4	.645	---	.663	.640	---	.679	.657	3
5	.657	---	---	.661	.641	.669	.657	3
6	.653	---	.633	---	.664	.661	.653	3
7	.667	0.621	---	---	.618	.670	.644	3
8	.675	.661	---	.675	.671	.688	.674	3
9[2]	.684	.685	---	.685	.681	.691	.685	2
10	.725	.687	.655	---	.681	.698	.689	3
11	.700	.696	.687	.715	.686	.724	.701	3
12[1,2]	.717	.699	.693	.701	.705	.719	.706	1
13[1]	.697	.709	.680	.716	.683	.691	.696	2
14[1,2]	.696	.697	.681	.694	.685	.696	.691	1
15	.681	.675	.643	.704	.685	.668	.676	3
16[2]	.681	---	.631	.671	.650	.657	.658	2
17[1,2]	.675	---	.611	.658	.629	.649	.644	1
18	.657	---	.617	.660	.653	.652	.648	3
19	.657	---	.659	.681	.662	.689	.670	3
20	.663	---	.633	.669	.651	.675	.658	3
21[2]	.653	---	.677	.652	.643	.667	.658	2
22[2]	.665	---	.644	.669	.625	.677	.656	2
23[2]	.679	---	.660	.667	.659	.668	.667	2
24[1]	.653	.663	.630	.692	.661	---	.660	2
25[1]	.663	---	.642	.648	.626	.637	.643	2
26	.664	---	.637	.637	.610	.651	.640	3
27	---	---	.601	.623	.610	.643	.619	3
28[2]	---	---	.596	.617	.631	.637	.620	2
29[2]	.621	---	.617	.619	.607	.619	.617	2
30[1,2]	.647	0.617	.627	.646	0.633	0.653	.637	1
31[1,2]	0.645	---	0.619	0.643	---	---	0.636	1

Greenwich Date	Difference of Longitude 5h 17m 36s.000+							Wt.
	No. 2	No. 4	No. 9	No. 13	No. 26	No. 28	Mean	
1926	s	s	s	s	s	s	s	
Nov. 1	0.659	0.615	0.633	0.650	0.641	0.645	0.641	3
2[2]	.669	---	---	.663	.649	.678	.665	2
3[2]	.695	.660	.658	---	.656	.710	.676	2
4	.678	---	.673	.681	.686	.701	.684	3
5	.703	---	.680	---	.659	---	.681	3
6[2]	.685	---	.683	.689	.685	---	.685	2
7	.706	.687	.697	.707	.675	.705	.696	3
8	---	---	.713	---	.691	.710	.705	3
9[1]	.701	.689	.703	.715	.671	.708	.698	2
10[1]	.673	---	.680	.669	.652	.684	.672	2
11	.668	.661	.654	---	.659	---	.661	3
12	.671	---	.639	.679	.653	.681	.665	3
13	.668	.662	.651	.675	.671	---	.665	3
14[1]	---	---	.657	.657	.629	---	.648	2
15	.647	.629	.661	.666	.631	.663	.649	3
16[1,2]	.665	---	.653	.678	.680	---	.669	1
17[2]	.693	.671	.697	---	.637	.687	.677	2
18[2]	.682	---	.655	.682	.679	---	.675	2
19[2]	---	.686	.674	.695	.653	---	.677	2
20	---	.651	.682	.687	.669	.693	.676	3
21[1]	---	---	---	.697	.683	.687	.689	2
22[1]	---	.663	.655	.664	---	.669	.663	2
23[2]	.669	---	.657	.689	.629	---	.661	2
24[2]	---	---	.617	---	.617	.637	.624	2
25[2]	.648	.611	.593	.589	.607	---	.610	-
26[1,2]	---	---	.627	.641	---	.640	.636	-
27[1,2]	.654	.655	---	.632	.622	.626	.638	-
28[2]	.621	.639	.617	.652	.651	.653	.639	-
29[2]	---	0.666	.635	.662	.646	.681	.658	-
30[1,2]	0.671	---	0.659	0.672	0.649	0.669	0.664	-

[1] No star observations at Washington.

[2] No star observations at Paris.

		h	m	s
Mean longitude, by signals	No. 2, Annapolis	5	17	36. 673
	No. 4, Bellevue			36. 667
	No. 9, Bordeaux			36. 655
	No. 13, Annapolis			36. 672
	No. 26, Bordeaux			36. 656
	No. 28, Annapolis			36. 675
	All	5	17	36. 666
Mean longitude, by radio sending stations	Annapolis and Bellevue	5	17	36. 673
	Bordeaux			36. 655
	Mean	5	17	36. 664
Weighted mean longitude, by dates	October	5	17	36. 660
	November			36. 671
	All	5	17	36. 665±0. 0019 s

TABLE XXI.—*Longitude, Washington–Algiers*

Geenwich Date	Difference of Longitude $5^h\ 20^m\ 24^s.000+$							Wt.	Greenwich Date	Difference of Longitude $5^h\ 20^m\ 24^s.000+$							Wt.
	No. 2	No. 4	No. 9	No. 13	No. 26	No. 28	Mean			No. 2	No. 4	No. 9	No. 13	No. 26	No. 28	Mean	
1926	s	s	s	s	s	s	s		1926	s	s	s	s	s	s	s	
Oct. 2 [1]	0.315	0.302	---	---	0.285	0.319	0.305	2	Nov. 1 [2]	0.266	0.241	0.261	---	0.277	0.274	0.264	2
3	---	---	0.284	---	---	---	.284	2	2	.288	.270	---	---	.285	.280	.281	3
4	.292	---	.275	---	---	.294	.287	3	3	.311	.293	.283	0.292	.295	.312	.298	3
5	.278	.266	---	---	.260	---	.268	3	4	.308	.261	.291	---	.304	.320	.297	3
6	---	.274	.225	---	.273	---	.257	3	5 [2]	.296	---	---	---	.267	.296	.286	2
7	.276	.262	---	---	.241	.254	.258	3	6	.282	.258	.269	---	.285	.286	.276	3
8	.286	.277	---	---	.290	---	.284	3	7	.301	.278	.292	.287	.279	.310	.291	3
9	.296	.312	---	---	.296	.329	.308	3	8	.254	.257	.295	.296	.281	---	.277	3
10	---	---	.271	---	.283	---	.277	3	9 [1]	.284	.270	.280	.281	.280	.302	.283	2
11	.320	.323	---	---	.297	.301	.310	3	10 [1]	.271	---	.274	---	.261	.280	.272	2
12 [1]	.324	.304	.297	---	.311	---	.309	2	11	---	.250	.257	.262	.269	.272	.262	3
13 [1]	.324	.326	.293	---	.297	.302	.308	2	12	.270	.250	.248	.294	.261	.294	.270	3
14 [1]	.301	.324	.289	---	.281	.287	.296	2	13	.264	.258	.243	---	.253	.282	.260	3
15	.276	.274	.242	---	.290	.273	.271	3	14 [1]	.256	---	.251	.268	.247	.276	.260	2
16	.290	.244	.241	---	.261	.255	.258	3	15 [2]	.302	.280	.297	.290	.271	.284	.288	2
17 [1, 2]	.266	.264	.225	.248	.258	.245	.251	1	16 [1, 2]	.299	.300	.282	---	.310	---	.298	1
18	.267	---	.232	.266	.283	.283	.266	3	17 [2]	.300	---	.304	---	.257	.295	.289	2
19	.296	---	.277	---	.281	.285	.285	3	18	.299	.269	.261	---	.300	.319	.290	3
20	.272	---	.246	---	.277	.266	.265	3	19	.318	.297	.284	.304	.273	.285	.294	3
21 [2]	.243	---	.277	---	.207	.228	.239	2	20	---	.274	.274	.280	.266	.286	.276	3
22	.256	.240	.251	---	.236	.262	.249	3	21 [1]	.256	.274	---	.276	.265	.286	.271	2
23	.286	---	.267	---	---	---	.276	3	22 [1]	.256	.246	.243	.246	---	.261	.250	2
24 [1]	---	---	---	---	.291	---	.291	1	23	.255	---	.260	.284	.253	.296	.270	3
25 [1]	---	---	---	.287	.288	.274	.283	2	24 [2]	.240	.252	.252	.290	.258	.269	.260	2
26	.278	---	.291	.252	.241	.262	.265	3	25	.274	.246	.228	.243	.257	.238	.248	3
27	.219	---	.253	---	.239	.250	.240	3	26 [1]	.261	.264	.248	.252	---	.288	.263	2
28	.242	.246	.222	.253	.259	.262	.247	3	27 [1]	.277	.276	---	.256	.256	.276	.268	2
29 [2]	.277	0.264	---	---	---	---	.270	2	28	.271	.266	.249	.272	.297	.291	.274	3
30 [1, 2]	---	---	.231	.267	0.252	.275	.256	1	29	.284	---	.265	.302	.287	.308	.289	3
31 [1, 2]	0.268	---	0.243	0.267	---	0.281	0.265	1	30 [1]	.318	.314	.305	0.310	0.304	0.332	.314	2
									Dec. 1	0.310	0.310	0.293	---	---	---	0.304	3

[1] No star observations at Washington.

[2] No star observations at Algiers.

		h	m	s
Mean longitude, by signals	No. 2, Annapolis	5	20	24.281
	No. 4, Bellevue			24.275
	No. 9, Bordeaux			24.265
	No. 13, Annapolis			24.275
	No. 26, Bordeaux			24.273
	No. 28, Annapolis			24.283
	All	5	20	24.276
Mean longitude, by radio sending stations	Annapolis and Bellevue	5	20	24.279
	Bordeaux			24.269
	Mean	5	20	24.274
Weighted mean longitude, by dates	October	5	20	24.274
	November			24.278
	All	5	20	24.276 ± 0.0016 s

TABLE XXI.—*Longitude, Shanghai–Washington*

Greenwich Date	Difference of Longitude $10^h\ 46^m\ 1^s.000+$					Wt.	Greenwich Date	Difference of Longitude $10^h\ 46^m\ 1^s.000+$					Wt.
	No. 9	No. 16	No. 17	No. 26	Mean			No. 9	No. 16	No. 17	No. 26	Mean	
1926	s	s	s	s	s		1926	s	s	s	s	s	
Oct. 2[1]	---	---	---	0.404	0.404	1	Nov. 1[2]	---	0.373	---	0.368	0.370	2
3	---	---	---	---	---	--	2	---	.369	---	.348	.358	3
4[2]	---	---	---	---	---	--	3	0.350	---	---	---	.350	2
5[2]	---	---	---	.454	.454	1	4	---	.335	---	.342	.338	3
6[2]	---	---	---	.402	.402	1	5	---	---	---	.364	.364	2
7[2]	---	---	---	.380	.380	1	6	---	---	---	.358	.358	2
8	---	---	---	.360	.360	2	7	---	.349	---	.378	.364	3
9[2]	---	---	---	.366	.366	1	8	---	---	---	.364	.364	2
10[2]	---	---	---	.370	.370	1	9[1]	.346	---	---	.378	.362	2
11	0.384	---	---	.354	.369	3	10[1]	---	.373	---	.374	.374	2
12[1]	.370	---	0.348	.364	.361	2	11	---	.353	---	.348	.350	3
13[1]	.346	---	---	.376	.361	2	12[2]	---	---	---	.362	.362	1
14[1,2]	---	0.425	.409	.408	.414	1	13[2]	---	---	---	.374	.374	1
15[2]	.422	---	---	.388	.405	2	14[1,2]	---	.360	---	.378	.369	1
16	.426	---	---	.396	.411	3	15[2]	---	.343	---	.378	.360	2
17[1]	.428	---	---	.376	.402	2	16[1,2]	.342	---	---	.324	.333	1
18	.414	---	---	.394	.404	3	17[2]	.301	---	---	.412	.356	2
19	0.355	---	---	.346	.350	3	18	---	---	---	.362	.362	2
20	---	---	---	.344	.344	2	19	---	.367	---	.358	.362	3
21	---	---	---	.362	.362	2	20	---	---	---	.348	.348	2
22	---	.389	---	.382	.386	3	21[1,2]	---	.373	---	.322	.348	1
23	---	---	0.345	.284	.314	3	22[1]	---	---	---	---	---	-
24[1]	---	---	---	.294	.294	1	23	---	---	---	.346	.346	2
25[1]	---	---	---	.327	.327	1	24[2]	---	.345	---	.336	.340	2
26[2]	---	---	---	.356	.356	1	25[2]	---	.352	---	.362	.357	2
27	---	---	---	.346	.346	2	26[1]	---	---	---	---	---	-
28	---	.357	---	.342	.350	3	27[1,2]	---	---	---	.342	.342	1
29	---	.376	---	.366	.371	3	28[2]	.338	---	0.363	.272	.324	2
30[1]	---	.368	---	0.362	.365	2	29	---	---	---	.414	.414	2
31[1]	---	0.371	---	---	0.371	1	30[1,2]	(0.230)	(0.221)	---	(0.236)	(0.229)	-

[1] No star observations at Washington.

[2] No star observations at Shanghai.

		h	m	s
Mean longitude, by signals	No. 9, Bordeaux	10	46	1. 371
	No. 16, Honolulu			1. 365
	No. 17, Honolulu			1. 366
	No. 26, Bordeaux			1. 363
	All	10	46	1. 365
Mean longitude, by radio sending stations	Honolulu	10	46	1. 365
	Bordeaux			1. 364
	Mean	10	46	1. 364
Weighted mean longitude, by dates	October	10	46	1. 370
	November			1. 357
	All	10	46	1. 364 ± $0^s.0023$

TABLE XXII.—*Recapitulation of Longitude Differences*

	h	m	s	s
San Diego–Algiers	8	0	56. 902	±0. 0020
Algiers–Shanghai	7	53	34. 365	± . 0029
Shanghai–San Diego	8	5	28. 731	± . 0025
San Diego–Greenwich	7	48	48. 374	± . 0022
San Diego–Paris	7	58	9. 295	± . 0024
San Diego–Washington	2	40	32. 624	± . 0018
Washington–Greenwich	5	8	15. 751	± . 0013
Washington–Paris	5	17	36. 665	± . 0019
Washington–Algiers	5	20	24. 276	± . 0016
Shanghai–Washington	10	46	1. 364	± . 0023

Results of 1913–14 Longitude Work by Radio for Comparison

	h	m	s	s
Washington–Paris, American observers, radio observations by ear coincidences	5	17	36. 653	±0. 0031
Washington–Paris, French observers, radio observations by ear coincidences	5	17	36. 651	±0. 003
Washington–Paris, French observers, radio obervations by registration	5	17	36. 682	

For details of the 1913–14 work see Publications United States Naval Observatory, Second Series, Volume IX, Appendix, which also contains a recapitulation of all previous trans-Atlantic longitude determinations, and Determination par Telegraphie sans Fil, en 1913–14, de la Difference de Longitude entre les Observatoires de Paris et de Washington, par M. Henri Renan, in Bulletin Astronomique, Tome XXXIII.

TABLE XXIII.—*Closing Errors*

	s
San Diego, Algiers, Shanghai	0. 002
San Diego, Washington, Algiers	0. 002
San Diego, Washington, Paris	0. 006
San Diego, Washington, Greenwich	0. 001
San Diego, Paris, Greenwich [1]	0. 009
Washington, Paris, Greenwich [1]	0. 002

[1] Using a value of the Greenwich-Paris longitude of $0^h\ 9^m\ 20^s.912$, obtained from the same material that was used in the above determinations.

○